

Technical COMMUNICATION

Journal of the Society for Technical Communication



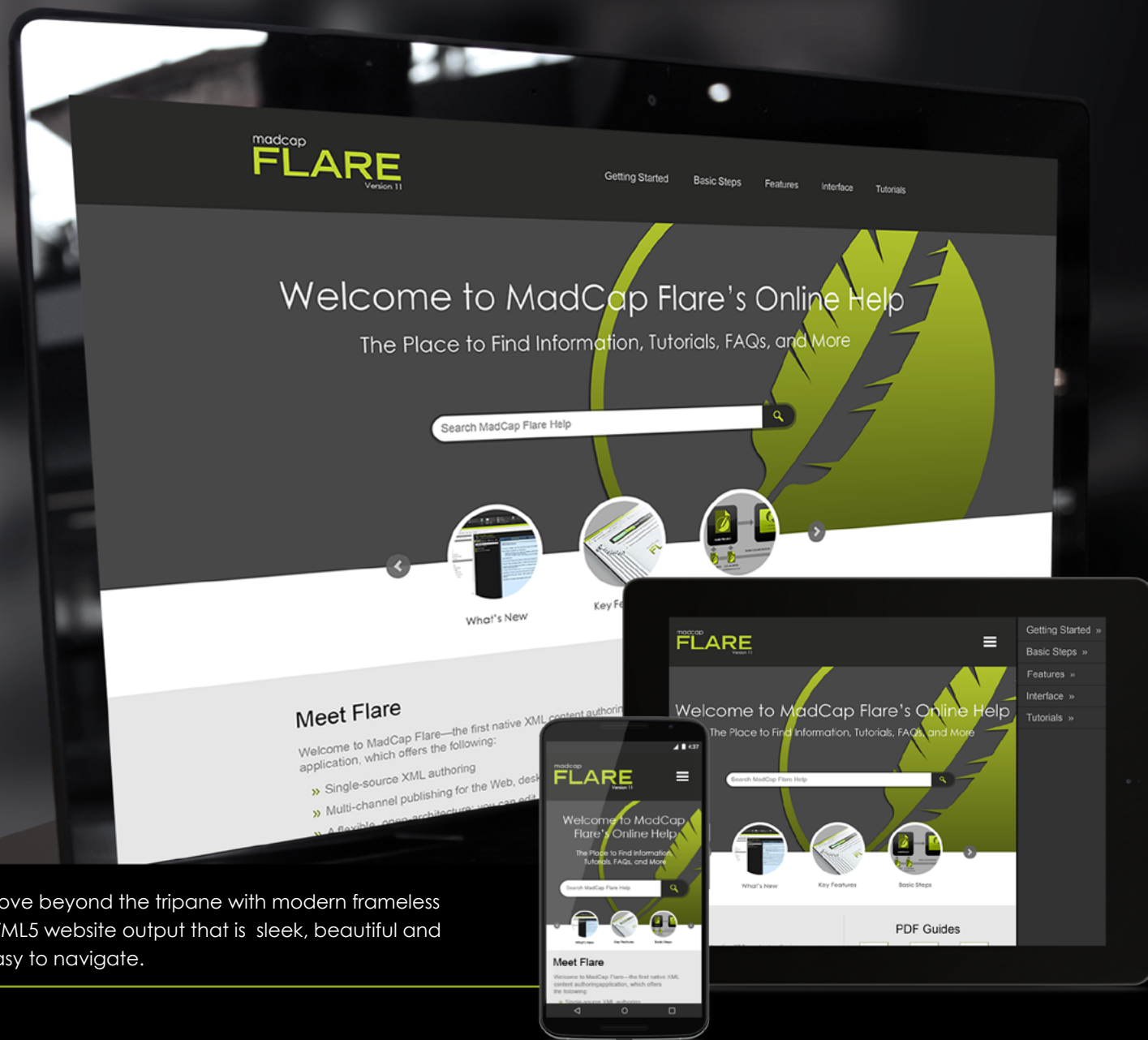
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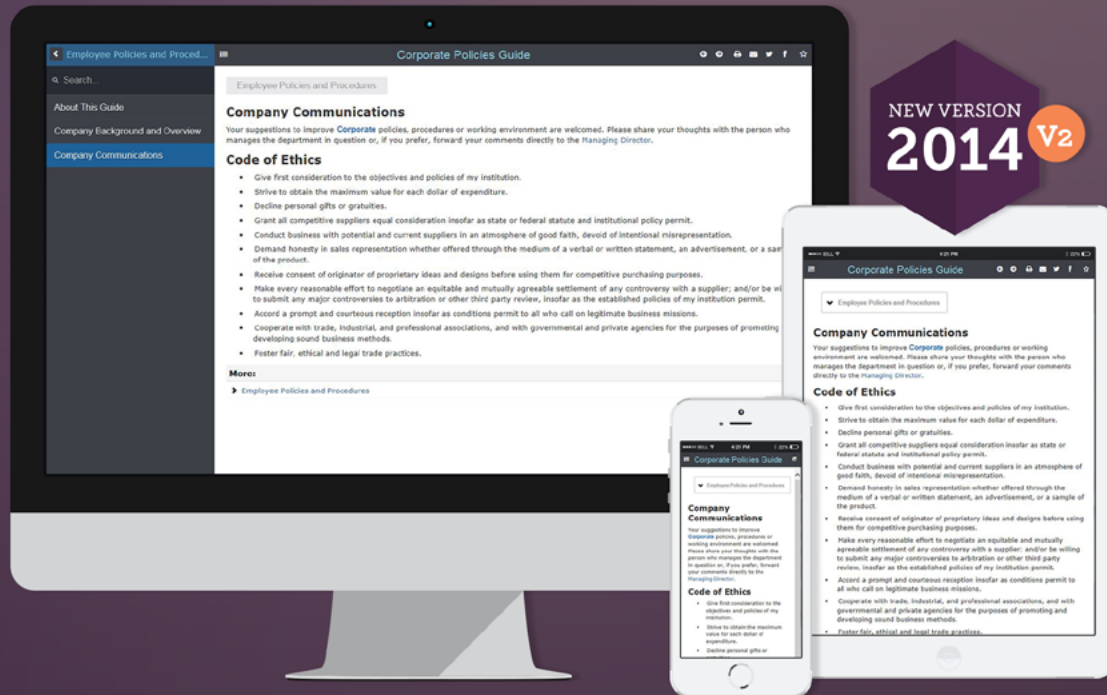
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POSTMASTER: Send address changes to *Technical Communication*, 9401 Lee Highway, Suite 300, Fairfax, VA 22031-1803, USA. Printed in the USA.

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Technical COMMUNICATION

VOLUME 62, NUMBER 1

February 2015

ISSN 0049-3155

FEBRUARY 2015

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About the Journal

Technical Communication is a peer-reviewed, quarterly journal published by the Society for Technical Communication (STC). It is aimed at an audience of technical communication practitioners and academics. The journal's goal is to contribute to the body of knowledge of the field of technical communication from a multidisciplinary perspective, with special emphasis on the combination of academic rigor and practical relevance.

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Menno D.T. de Jong, Editor



Technical Communication in a Globalized World

Even more than other communication sub disciplines, technical communication has become a globalized field. Since most technology does not stop at national borders, technical companies are dealing with international markets. Even companies that start as small-scale local initiatives will be confronted with international issues once they become successful. And let us not forget the level of internationalization within our own countries: user groups have become considerably more diverse, both in language and in culture. We do not have to travel anymore to experience the globalized world.

Technical communication academics and practitioners recognized the significance of the consequences of a globalized world for our discipline decades ago. When I entered the field, around 1995, intercultural technical communication was already an important and promising topic. Throughout the years we have seen articles on various aspects of the globalized world, varying from non U.S. technical communication education to offshoring and outsourcing, and from analyses of cultural differences among users and documents to accounts of the local historical contexts of technical communication genres.

The implications of a globalized world for technical communication may be found in three areas:

translation, localization, and cross-cultural and intercultural communication. Despite promising research contributions on these areas, the overall picture of research is still fragmented.

Translation

With a few exceptions, such as Maylath (2013) and Maylath *et al.* (2013), the interface between technical communication and translation has been underexposed in the technical communication literature. However, the challenges and the developments in this area seem to be huge. Challenges involve the need to translate large amounts of information into many different languages. The costs of such operations may be very high, in addition to the costs of producing the information in the first place. Developments involve the rapid developments in the fields of automated and computer-aided translation. Such developments might have consequences for the specifications of the source text and for the professions of technical communicators and translators. More research connecting the fields of technical translation and technical communication is needed.

Localization

A problem with the term 'localization' is that it is used in two ways. Narrowly defined, it involves the adjustment of content to national contexts, which may

vary from superficial (for example, changing addresses for customer support) to intrinsic (for example, adjusting the instructions for usage preferences that may differ between countries). Broadly defined, it not only comprises such content localization, but also translation quality and cultural customization (see Chao, Singh, Hsu, Chen, & Chao, 2012). Depending on the perspective chosen, localization may vary from the least to the most far-reaching adaptation of products or user support. Too little is known about the localization strategies companies choose and about the way technical communicators implement those. Again, more research is needed here.

Cross-Cultural and Intercultural Communication

By far, the most research attention has been paid to the topics of cross-cultural and intercultural communication. Cross-cultural communication involves comparisons between cultures; intercultural communication the interaction between cultures. Studies have taken *emic* perspectives (aimed at understanding a culture from within) as well as *etic* perspectives (aimed at comparing different cultures).

Although many individual studies have provided us with

interesting and valuable insights, the body of research as a whole seems to have serious shortcomings. First, the various studies seem to be scattered across topics and cultures, which obscures the emergence of an overall picture. Second, relatively many studies focus on comparisons of documents, and do not involve the performance and experiences of users from different cultures. This leads to ambiguous results as the differences found may not correspond to the preferences of users but may be attributable to traditions in and developments within the professional field. In western cultures, for instance, it has taken many years before we realized that the directness of an instructive style is most effective in technical communication. Third, a convincing theoretical framework seems to be lacking. There seems to be a gap between “top-down” research that departs from cultural dimensions, such as those proposed by Hofstede (2001), and “bottom-up” research that departs from specific communication variables. So far, the two research lines do not seem to meet. I have not seen many persuasive translations of general cultural dimensions into specific document characteristics.

Interface between Translation, Localization and Culture

Perhaps the most exciting research would involve the interface between the three topics. It goes without saying that there will be tensions between translation on the one hand, in which the role of automated sub processes is growing, and localization and cross-cultural communication on the

other hand, which call for cultural knowledge, sensitivity, and empathy. It would be very interesting to see how technical companies handle such issues in practice, and how technical communication practitioners view the optimal integration of the three issues.

In This Issue

This issue contains four articles. The first two articles address the relationship between technical communication and user-generated content.

In the first article, Jo Mackiewicz analyzes the quality aspects of online product reviews. What makes a helpful review, and how can technical communication professionals facilitate and manage this type of user-generated content? She answers these questions on the basis of a literature review and exemplifies her observations using a corpus of product reviews.

In the second article, Jason Swarts investigates the role of technical communicators in the functioning of software user forums. His article can be seen as the next step after last year's contribution by Jordan Frith on the same topic. Swarts interviewed moderators and frequent posters on four user forums. On the basis of his results, he specifies three types of contributions: clarifying software problems, maintaining ties between community members, and creating an infrastructure for storing and retrieving information.

The third article focuses on technical communication education. In the context of an Austrian aeronautical engineering program, Dietmar Tatzl developed, taught and evaluated a technical

communication project designed to simulate a professional workplace environment. He provides a description of the course as well as an account of its evaluation, which turned out to be very positive.

The fourth article, by Petra ten Hove and Hans van der Meij, investigates the design of instructional videos. This, again, connects well to several earlier contributions in *Technical Communication*, most notably by Jason Swarts and Hans van der Meij. Ten Hove and Van der Meij tried to predict instructional YouTube videos' popularity—they propose a formula to assess this—using a limited set of physical characteristics: resolution, visuals, verbal & sound, and tempo. They showed that popular videos scored high on nearly all physical characteristics.

References

- Chao, M. C., Singh, N., Hsu, C.-C., Chen, I.F. N., & Chao, J. (2012). Web site localization in the Chinese market. *Journal of Electronic Commerce Research*, 13(1), 33-49.
- Hofstede, G. (2001). *Culture's consequences. Comparing values, behaviors, institutions and organizations across nation*. (2nd ed.). Thousand Oaks, CA: Sage.
- Maylath, B. (2013). Current trends in translation. *Communication & Language at Work*, 1(2), 41-50.
- Maylath, B., et al. (2013). Managing complexity: A technical communication translation case study in multilateral international collaboration. *Technical Communication Quarterly*, 22(1), 67-84.

Quality in Product Reviews: What Technical Communicators Should Know

Jo Mackiewicz

Abstract

Purpose: Measuring the quality of product reviews via helpfulness votes is problematic for several reasons. I delineate the components of product review quality in order to assist technical communicators who manage their organizations' user-generated content in identifying quality content and in helping reviewers produce quality content.

Method/Corpus: I analyze results from secondary research on product reviews and discuss six important components of review quality. I focus most attention on five components of review quality that technical communicators can assess— informativeness, valance, credibility, conformity, and readability—and briefly describe a sixth component—user characteristics. I also exemplify these components, drawing from a corpus of 8,973 product reviews gathered in 2013 from a variety of retail and review websites.

Results: Based on this analysis, I recommend strategies that technical communicators can use (1) to identify these components of review quality, (2) to develop a rich data set from which they can glean consumer wants and needs as well as trends related to their organizations' products, and (3) to help reviewers write better reviews.

Conclusions: As the amount of user-generated content grows, the need to learn from it and the need to improve it grow. By using their knowledge and skills in new ways, technical communicators who manage and develop product reviews can stay relevant and necessary as organizations rely more and more heavily on user-generated content.

Keywords: credibility, informativeness, product reviews, quality, readability, user-generated content

Practitioner's Takeaway

- Using helpfulness votes to ascertain the quality of product reviews is problematic for several reasons; for example, new reviews often have few or no votes.
- With a research-based heuristic, technical communicators can identify six components of quality reviews and then mine product reviews for product trends and other information.
- Being able to assess review quality enables technical communicators charged with developing and managing their organizations' product reviews and other user-generated content to improve the content that users contribute.

Quality in Product Reviews

Introduction

Quality in technical and professional communication eludes hard and fast definitions, but some technical communication scholars have attempted the task of defining quality. Shelby (1998), for example, asserts that a quality document bridges individual and collective tastes, conforms to expectations, and is fit to use (p. 392). To most effectively analyze quality, a technical communicator considers a document's context: an audience's needs and expectations at a given time, a writer's communicative goals, and the texts with which that document intersects and corresponds.

However, as technical communicators look for ways to grapple with an influx of user-generated content (UGC)—product reviews in particular—they can benefit from a general heuristic for assessing quality across contexts. This article delineates the components of product review quality in order to assist technical communicators who manage their organizations' UGC in identifying quality content and in helping reviewers produce quality content.

Analyzing and Managing UGC

In multiple forms of UGC, people share their opinions on nearly every imaginable topic. In the immense UGC category of online product reviews, consumers evaluate everything from theme parks to yoga mats. Not surprisingly, then, review quality hinges on multiple variables. By delineating those components of quality—all the while keeping in mind the variety of rhetorical situations that encapsulate reviews—technical communicators can better use them to assess and promote content quality.

Take as an example this excerpt from a review of La Mer facial cream. The reviewer offers a recommendation targeted toward a specific group of potential consumers:

I recommend this product but this is definitely not for everyone. It took some time before I adjusted to the “weird” feeling of not feeling traces of my moisturiser after application. If you feel that the regular creme is too heavy for your skin or that the gel creme does not provide you with enough of a hydrated feeling, this soft creme format may be your perfect medium.

As I discuss in more detail below, research shows that explicit recommendations such as the one in this review (“I recommend this product but this is definitely not for everyone”), particularly recommendations that point to specific types of consumers who might want (or might want to avoid) the product, contribute to review quality. Technical communicators who can identify and foster such recommendations can better meet the needs of their organizations and of review users.

Sophistication in analyzing product reviews and other UGC grows more important as the amount of UGC continues to increase. According to Ian Tenenbaum of Crowdtap, a start-up company that analyzes social media for companies such as Ikea and American Express, users generated 80% of 2013's online content—up 35% in five years (2013). Technical communicators are more and more often called upon to marshal and make sense of the vast amount of data that companies and organizations need to understand and, eventually, to use in choosing and improving products—a change that many see as positive:

This particular trend [ubiquity of and reliance on social media] presents fantastic opportunities for technical communicators to engage in conversation with end users, be more responsive to their issues, and tap into their knowledge to create even better, more meaningful content. (Adobe Systems, Inc., 2011)

That technical communicators increasingly engage in such conversations is readily apparent in the findings of Frith's (2014) study of 23 moderators of online help forums. He found that the roles forum moderators took on “closely resembled the roles many technical communicators play in the workplace” (p. 180). Specifically, he found that forum moderators, like technical communicators, act as (1) knowledgeable nonexperts on the subject matter, (2) quality control experts, (3) translators of complicated, technical material, (4) information architects (for example, as FAQ and SOP developers), and (5) tone setters who establish “what is and is not appropriate” behavior (pp. 177–180). Based on his analysis, Frith (2014) concludes that technical communicators can “make a persuasive case that they have the technical and rhetorical skills to manage large communities” of content-generating users (p. 182). Technical communicators already are playing a substantial role in the development and management

of UGC, and it appears that need for their expertise will only continue to grow.

Aside from the need for technical communicators to analyze and manage a vast amount of UGC, the need for technical communicators to play a role in improving the quality of UGC appears to be imminent. As O'Mahony and Smyth (2010) point out about UGC quality, "Anybody motivated to create content is virtually free to do so, and there is little or no quality assurance applied a priori to such content" (p. 164). With little oversight, the quality of UGC ranges widely; indeed, research supports the perception that much UGC lacks quality (for example, Rello & Baeza-Yates, 2012). Given the continued growth of UGC and users' (unsurprising) preference for quality content (for example, Ghose & Ipeirotis, 2011), technical communicators charged with mining and managing the content that users contribute have an exciting opportunity to put their knowledge and skills to work in new ways.

One way that retailer, brand, and review websites have addressed the problem of assessing quality in product reviews is to allow users to vote on or rate the helpfulness of reviews. These votes and ratings serve as one means to determine review quality. They have become a common means by which marketing, natural language processing, technical and professional communication, and other researchers operationalize review quality. Some sites, including the retailer Amazon.com, use a yes/no question ("Was this helpful to you?") to gauge a review's helpfulness. Other sites use comparable methods of assessing helpfulness. Allrecipes.com, for example, uses thumbs-up or thumbs-down votes. Such votes matter because sites often have a mechanism for sorting reviews by helpfulness votes, so reviews with votes and with the best ratio of helpful votes to total votes can get more exposure. Such systems for assessing quality via helpfulness votes, however, possess substantial validity problems and are therefore insufficient for technical communicators who monitor and manage UGC for their organizations.

Relying on helpfulness votes to determine review quality is problematic for several reasons. First, as Cao, Duan, and Gan (2011) point out, many reviews—even ones that have been posted for some time—have no helpfulness votes at all (p. 512). In their data, 3,500 reviews from CNET Download, 51% of the reviews had no helpfulness votes (p. 513). Liu *et al.* (2008) neatly delineate several other problems with using helpfulness votes to operationalize review quality:

- (1) New reviews often have few or no votes. Liu *et al.* (2007) call this "early-bird bias" (p. 334). However, as Otterbacher (2011) points out, the extent to which review prominence relies on recency differs among sites containing reviews. On some sites, new reviews are more prominent than older reviews and thus are more likely to obtain helpfulness votes (p. 433).
- (2) Some reviews fall victim to spam voting.
- (3) Presentation according to helpfulness rankings causes a "rich-get-richer" scenario. Users see only the highest-ranked reviews, "leaving no opportunities for the newly published yet unvoted reviews to show up on users' radar" (Liu *et al.*, 2008, p. 443). Liu *et al.* (2007) call this phenomenon "winner circle bias" (p. 336).

When quality reviews fall through the cracks, users miss out on useful content that could help them make purchasing decisions. As important, when quality reviews get lost in the UGC shuffle, hard-working reviewers may lose motivation and thus be less likely to contribute to a site again. For technical communicators charged with analyzing reviews to understand consumers' preferences and needs and to understand product trends and for those charged with helping reviewers generate more useful reviews will need to move beyond solely looking to helpfulness votes for indications of quality.

My goal here is to help technical communicators supplant quality measures of helpfulness votes. To do so, I discuss six important components of product review quality, focusing most attention on five components of review quality that technical communicators can assess—*informativeness, valance, credibility, conformity, and readability*—and briefly describing a sixth component—*user characteristics* (see figure 1). I focus on the first five components because prior research indicates their important contribution to review quality (Mackiewicz & Yeats, 2014; Yeats & Mackiewicz, 2014) and, on a pragmatic level, technical communicators can readily influence these five components of quality. Assessing user characteristics, such as users' purpose in reading reviews, their tolerance for risk, or their intent to buy, requires methods beyond analysis of review text. In addition to describing these quality components, I also exemplify them, drawing from a corpus of 8,973 product reviews gathered in 2013 from a variety of retail and review websites. In being able to identify these components of

Quality in Product Reviews

review quality, technical communicators can develop a rich data set from which they can glean consumer wants and needs and trends related to their organizations' products and help reviewers write better reviews.

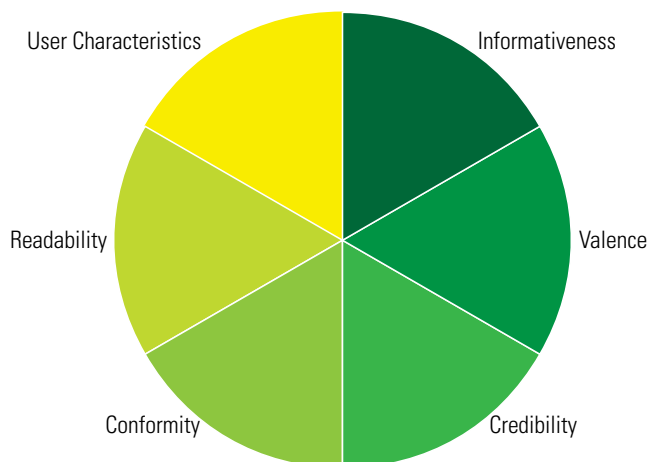


Figure 1. The Components of Review Quality. Technical Communicators Can Influence Five of the Six Components: Review Informativeness, Valence, Credibility, Conformity, and Readability.

Review Corpus

As mentioned above, the examples here come from a corpus of 8,973 reviews with helpfulness votes—either positive or negative or a combination of both—randomly scraped from a wide range of brand and retailer sites in 2013. The reviews covered products such as these: Rayovac LED Tactical Flashlight, Marcella Wing Collar Evening Shirt, Jif Irresistible Peanut Butter Cookies, Williams Sonoma Breville Crispy Crust Pizza Maker, PepBoys Peak Performance 900 Peak Amp Jump Starter, Pampers Cruisers Diapers, Avon Foot Works Healthy Rough Skin Remover, Valspar Duramax Exterior Paint, Fidelity Rollover IRA, and TurboTax Online Federal Free Edition 2012.¹ I chose examples in this article from this corpus based on their ability to illustrate the components of quality that, as I discuss, research has shown to play an important role in generating review quality.

An important, related topic—one beyond the scope of my purpose here—is the challenge of detecting fake reviews. See Ong, Mannino, and Gregg (2014) and Ott, Choi, Cardie, and Hancock (2011) for two important studies related to fake (or “shill”) reviews.

Components of Review Quality

In the next section, I discuss and exemplify six components of product review quality, paying particular attention to the five components that technical communicators can readily influence: informativeness, valence, credibility, conformity, and readability.

Informativeness

Perhaps the most important component of quality—certainly the one that is most obviously necessary—is the extent to which a review informs users so that they can make good purchasing decisions. Review research operationalizes informativeness in a variety of ways:

- review length (word count)
- a balance of subjective (evaluative) and objective (descriptive) statements
- explicit statements of recommendation and of expectations met.

Here I discuss these characteristics of review informativeness.

Review Length. Obviously, critically important to quality is the extent to which the review contains evidence or explanation in support of a reviewer's claims. Perhaps the easiest way to operationalize review informativeness is through review length—the number of words that the review contains. Mudambi and Schuff (2010) and Pan and Zhang (2011) tested the relationship between a review's length and the number of helpful votes it received and found the two were associated. Similarly, Schindler and Bickart (2012) found a relationship between review length and users' ratings of review valueness. These results suggest that technical communicators who are trying to identify quality reviews would do well to start with reviews that are at least longer than average. In my corpus of 8,973 reviews, the average review contained roughly 124 words. I calculated this average by dividing the average character count by 5, the average character count of a word in English (for example, WolframAlpha, 2014).

Related to such research on review length is Cao, Duan, and Gan's (2011) study of the impact of the length of the review title on users' perceptions of review quality. In contrast to the findings of studies of review length, the more words a review had in its title, the fewer helpfulness votes it received (p. 518).

Cao, Duan, and Gan (2011) write about this finding, “Too much information contained in the title may discourage people from reading the entire review before voting on it” (p. 518). Although more research would help solidify the advice to limit the word length of review titles, acting on this finding by creating succinct yet meaningful titles is one that technical communicators can freely put to use when they interact with reviewers about ways to improve the quality of their reviews. One simple way to improve review quality, it seems, is to create review titles that briefly sum up the main point.

A Balance of Subjective and Objective

Statements. Researchers have also operationalized informativeness by the degree to which a review balances objective (descriptive) and subjective (evaluative) content. Studying reviews of DVDs, audio and video equipment, and digital cameras, Ghose and Ipeirotis (2011) found that reviews containing a mix of objective and subjective content, especially “extreme,” or strong, subjective content, received high helpfulness ratings. Schindler and Bickart (2012) presented their participants with online purchasing scenarios and asked them to evaluate review valuableness. They divided the review content into two categories: (1) product evaluative (positive or negative) and (2) descriptive (reviewer descriptive or product descriptive). First, they found an association between product-descriptive statements and valuableness. In fact, participants appeared to tolerate “a large proportion of statements” that provided product description without any evaluation even more than they did “a large proportion” of positive evaluative statements (p. 238). Too many positive statements, they postulate, might “lead the reader to question the reviewer’s motives” whereas product-descriptive statements “may simply provide more useful information” and thus help users make purchasing decisions (p. 240). Balancing subjective statements with objective statements might increase a review’s value because it indicates a reviewer’s care in supporting his or her opinions.

The following excerpt, taken from a review of a Shoei GT-Air helmet, illustrates the review’s blend of evaluative and descriptive content. The review begins with a descriptive statement about the reviewer’s familiarity with the brand (a statement that builds credibility, a quality component discussed later) and then moves on to product evaluation:

...This will be the 3rd Shoei helmet I’ve owned, the other two being the Hornet dual sport and RF-1100. I’ve tried on the Qwest and Neotec several times, so I can speak to the fit comparison to them as well. For this review, I was able to go on a solid 30 minute ride in this helmet at sustained speeds up to 70mph. Right out of the box, the finish quality is everything we’ve come to expect from Shoei.

After this introduction, the reviewer moves on to product description:

My helmet is solid white and the paint and clear coat are flawless. I didn’t put the GT Air on a scale but I’d guess it’s about the same weight as the RF-1100. The breath deflector and pinlock lens are included but separate. ...

After this description of the helmet, the reviewer switches back to product evaluation—a blend of positive and mitigated negative evaluative statements about the helmet’s lining, vents, and face shield:

The liner is plush and padded on the sides but a little rough on top (I’m bald, FWIW#, almost like a soft scouring pad. It’s not uncomfortable, just noticeable. It’s the same fabric used on the crown of the liner in my Hornet, which softened up with use. The vents and face shield operate with strong, positive response, though I wish the lowest detent of the shield was a bit lower. ...

From this positive commentary, qualified with negative phrases such as “a little rough,” the reviewer moves on to stronger (more extreme) positive evaluation:

The star attraction to this helmet is the internal sun visor. I can testify that it lives up to the hype. The slide mechanism functions very smoothly and positively, is easy to find #even with thick, winter gloves), distortion-free, dark, and drops down further than other internal shades, fully shielding the eyes. ...

While this review’s length, 1036 words, certainly contributes to its quality, so does the reviewer’s ability to blend product description with product assessment, particularly positive evaluation, using words and

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phrases such as “lives up,” “easy,” and “fully.” Technical communicators who want to move beyond review length to assess informativeness can analyze a review’s blend of product description—objective statements—and positive and negative evaluation—subjective statements—to get greater insight into a review’s quality. In addition, technical communicators who work with reviewers to improve the quality of their content can do more than advise reviewers to “expand” their reviews or “add detail” to them but can instead explicitly state the kind of content—descriptive or evaluative—that rounds out a review and helps users make purchasing decisions.

Explicit Statements of Recommendation and of Expectations Met. Certain types of explicit subjective statements affect perceptions of review quality. Mackiewicz, Yeats, and Thornton (in review) tested the effect of two kinds of explicit subjective statements. First, they tested explicit statements of recommendation: (1) recommendations aimed at any potential purchasers (“I would recommend him and his staff to anyone”) and (2) recommendations aimed at a more limited set of consumers (“I would recommend this product for anyone who likes lizards, but doesn’t want to buy a big lizard that can bite”). Consumer research suggests that, in general, people take the easiest path to a solution, particularly when they are in a goal-oriented mode, such as making a purchasing decision (Van Schaik & Ling, 2009). As “cognitive misers” (Fiske & Taylor, 1991), consumers tend to rely on information that is easy to evaluate more than they do detailed information. Thus, Mackiewicz, Yeats, and Thornton (in review) hypothesized that participants would rate reviews with explicit recommendations as higher in quality, and their results supported this hypothesis. In addition, Mackiewicz, Yeats, and Thornton (in review) found that a statement about how well the product met the reviewer’s expectations also contributed to quality (“We love our new Tuscany windows as they exceeded our expectations in all respects”). Sparks and Browning (2011) note that the “impetus for writing a review is most likely to be due to a deviation from the norm resulting in disconfirmation of expectations” (p. 1312), so users might then particularly appreciate reviews in which reviewers explicitly point out that a product did indeed meet expectations. Users may perceive such statements of direct experience related to the gap between the reality of the product and their expectations for it as useful and thus as a contributor to quality.

Section Conclusion. To sum up this section, in relation to informativeness, technical communicators can identify and improve review quality by looking for (1) reviews that are longer than average; (2) reviews that balance subjective and objective statements; (3) reviews that contain explicit recommendations; and (4) reviews that explicitly state the how well the product met expectations.

Valence

A second important component of review quality is valence—the degree of positivity or negativity of a word, a statement, or an entire text. Using sentiment analysis, also called opinion mining, researchers differentiate among positive, negative, and neutral words, sentences (or statements), and documents (see Pang & Lee, 2008, for an overview). For example, in the following review of a hardwood floor, the adjectives “rewarding,” “outstanding,” and “easy” contribute positive sentiment:

As a professional fitter of 14 years I can say that this is a very rewarding floor. The finished result is outstanding. The locking system is very easy to work with, as the name goes (Easy-fit).

In contrast, “disappointed” contributes negative sentiment:

As a purchaser for many years of the 840 line, I am so disappointed in this newest version.

With sentiment analysis techniques, researchers can assign a sentiment rating to words that commonly convey positivity and negativity to gauge sentiment at a local or global level. But technical communicators looking to locate quality reviews in order to mine them for trends and insights into product users’ wants and needs do not necessarily have to learn such sophisticated techniques. For example, a more simple, albeit more crude, indication of a review’s valence is its product rating, usually measured on a 1-to-5 star scale that accompanies the text. Valence measured through star rating is just one way, however, to determine a review’s positivity or negativity. Technical communicators who understand some of the strong tendencies at play in relation to review valence, namely, positivity and negativity bias, can better identify quality reviews.

Positivity Bias. Studies of valence reveal two important tendencies—both called “positivity bias”—in relation to reviews. The first type of positivity bias refers to the tendency of reviewers to write positive reviews more often than they write negative reviews. McGlohon, Glance, and Reiter (2010), for example, gathered a data set of 8 million ratings of 560,000 products reviewed by 3.8 million reviewers. They found an “overwhelming majority” to be positive (p. 116). In the 8,973 reviews collected for this article, 6,334 (70.5%) were 4- or 5-star reviews. (In contrast, out of 8,973 reviews, 2,066 [23%] were 1- and 2-star reviews.) Hu, Pavlou, and Zhang (2009) deftly explain the reasons for a so-called J-shaped distribution of review ratings—the tendency toward rating extremes and positive extremes in particular. They say that people with positive opinions of a product will be more likely to purchase the product (purchasing bias) and subsequently write a review about it. Also, people with extreme opinions—whether positive or negative—are more likely to articulate their opinions in a review (reporting bias).

The second type of positivity bias says that “all else being equal, positive reviews have a greater probability of being rated as helpful than negative ones” (Pan & Zhang, 2011, p. 604). Users will rate a 5-star review as helpful more often than they will a 1-star review. The review of a carpet cleaner below illustrates positivity:

When I got my new carpet cleaner after my old Bissell quit working, I was so excited I had to use it right away! It was easy to put together, and easy to use. I did not have to stop and refill the water tank even once, which was nice, as I would have to stop two or three times with my old cleaner. I have two dogs and two cats, so we have a lot of pet hair around and lot of accidents. That said, we clean the carpets pretty often, and with the cleaner coming completely apart and being very easy to clean and put back together, it is incredibly convenient. I would highly recommend this carpet cleaner to my friends and family.

The reviewer assigned the product, a Bissell Deep Clean Premier, 5 stars—the highest star rating. Prior research indicates valence plays a substantial role in the extent to which a review user will perceive it as credible (Eisend, 2006; Schlosser, 2005, 2011), but exactly how valence affects credibility depends in part on whether the

product is a search product or an experience product. Search products are those for which consumers can obtain information before they make a purchase, thus reducing uncertainty about making the purchase. Carpet cleaners like the Bissell, as well as products such as bed frames and lawn mowers, are search products in that their utility stems from tangible, objective criteria such as dimensions, materials, and performance. The relative ease with which users can evaluate and compare search products makes them more likely to “feel rather comfortable relying on other consumers’ evaluations” (Sen & Lerman, 2007, p. 79), as “claims about tangible attributes are more easily substantiated” (Mudambi & Schuff, 2010, p. 189). An extremely positive review such as this one for the Bissell Deep Clean Premier, then, jibes with findings from prior research in that it is both highly positive and highly helpful.

In contrast, experience products such as books, movies, music, and food are those for which attributes “cannot be assessed without direct experience” (Bae & Lee, 2011, p. 256; Hu, Liu, & Zhang, 2008). Thus, as Nakayama, Sutcliffe, and Wan (2010) point out, the quality of an experience product is more salient after purchase and use. Zhao *et al.* (2013) write that users look to reviews of experiential products in particular because “unlike other products, these are consumed solely for the pleasure and experience they provide” (p. 154). For experience goods, moderate reviews as opposed to reviews with extremely high or low star ratings are positively associated with higher levels of helpfulness (Mudambi & Schuff, 2010, p. 194). Moderate star ratings mean reviewer has taken a temperate approach to his or her experience and has avoided extreme (unreasonable) opinions. In the following 3-star review, the reviewer narrates an experience at a resort that started out bad but was eventually rectified because the timeshare company intervened:

We arrived at Fort Lauderdale Beach Resort on Friday February 10, late that evening and I had called ahead to request if available an ocean view. Although I had called with my request more than once the attendant said there was no note of my request. He assigned us to unit 406 which turned out to be a lockout unit. This unit was so bad you could hear every word clearly that the people in the adjoining were saying even them making love. The

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only separation for this unit is a very thin wooden door that didn't even block the light.... We got up and as we started to clean up and shower we discovered there was still not only no hot water but there was no water at all.

The water came back on. This was about 1:00 PM. Saturday February 11, 2011. They had wasted a day and a half of our vacation depriving us of basic needs issues such as cleanness, noise and no water. No one ever explained we were getting a lockout unit nor no one called to tell us our water was off in our unit.

RCI had evidently called the resort to verify our complaints because things then happened for the best.

After all the above, they offered us a clean fresh unit with an ocean view that was not a lockout, So we moved...

This review of an experience product—a rented timeshare condo—delineates the problems the reviewer encountered upon arrival. The reviewer balances the list, however, by recognizing the customer service of the management company: “RCI had evidently called the resort to verify our complaints because things then happened for the best.” This review of an experience product shows quality in that it takes a moderate approach.

Negativity Bias. In contrast, some studies of valence's effect on quality point to a so-called negativity effect on users' perceptions of a review (for example, Roggeveen & Johar, 2002; Sen & Lerman, 2007). Some prior research, for example, shows that negative reviews have more influence than positive reviews on readers' perceptions of review credibility and on their purchasing decisions (Chevalier & Mayzlin, 2006; Gupta & Harris, 2009). This negativity effect (Baumeister et al., 2001; Rozin & Royzman, 2001) says that consumers place greater emphasis on negative information because they encounter it less frequently (because of reviewers' tendency to write positive reviews). People see negativity as counter normative (Feldman, 1966; Kanouse & Hanson, 1972; Zajonc, 1968) and, therefore, it is more “alerting,” possibly triggering a “be cautious” attitude in potential consumers” (Fiske, 1993, p. 318). Cao, Duan, and Gan (2011) found that the greater number of words in a review's “con” section, the more helpfulness votes that review received: “More words in [the] ‘cons’ part of the review may encourage more people to read it

and then vote on it” (p. 518). It makes sense then, that Metzger, Flanagin, and Medders (2010) and Sparks and Browning (2011) found that people relied more heavily on negative reviews in making purchasing decisions. To the extent that their participants perceived the negative reviews as helpful, they would be more likely to use them to decide what to buy. Cao, Duan, and Gan's (2011) results are also consistent with Yang and Mai's (2010) findings, along with the findings of Papathanassis and Knolle's (2011) grounded-theory study, which showed a tendency for negative reviews to have more impact than positive reviews.

The following review illustrates negativity. The reviewer asserts familiarity with the brand, establishing credibility, and then details the many problems she has experienced with the Lulumon Wunder Under Crop:

As a long-time Lulu customer who has spent many(!) of her precious dollars on Lulu products over the years (and who has frequently urged friends/family to join in the Lulu love), I absolutely echo all of the complaints about plummeting product quality, ridiculously wrong re-designs of previously well-loved and highly rated products, and skyrocketing prices to accompany all of the wrongness!

In terms of design for this specific product -- please please please fix the gusset issue and declare that you've done so such that I don't have to trial-and-error my way to a decent pair of WUs! In my opinion, it may not just be the triangle/diamond swap issue and, unfortunately, it may also stem from poor construction (mass production perhaps caused compromises in the quality, no?). I notice in my recent pairs with the diamond, its awkward back placement (which is different than older pairs) also creates issues. Whatever the cause, this much I know to be true: WUs now fit horribly and they used to do just the opposite. In terms of fabric quality, I again reiterate others' concerns.

Overall, I am incredibly sad and frustrated that I have to work so hard and spend so much money, time and effort to get my hands on products that I used to cherish and thoroughly enjoy.

This negative, 1-star review showcases the kind of product information that technical communicators can mine from UGC for product improvement. The reviewer not only delineates the product's flaws, she also performs

a call to action—a pleading request that Lulumon “please please please fix the gussett issue.” This review also exemplifies Sen and Lerman’s (2007) finding that negativity bias more strongly affects users’ perceptions of search products like the Lulumon Wunder Under Crop.

Section Conclusion. To sum up this section, technical communicators can use valence to identify information that can benefit their organizations if they look for (1) reviews of search products that are positive, (2) reviews of experience products that are moderate, and (3) reviews that contain some negative evaluation.

Credibility

A third important component of product review quality is the credibility of the reviewer. Dividing the credibility construct into two component parts, essentially viewing credibility through the lens of traditional, Aristotelian rhetoric, helps reveal characteristics that influence review quality. Traditional rhetoric discusses credibility as *ethos*. Invented *ethos* arises out of a single rhetorical situation, from the text-at-hand, such as a product review. Situated *ethos*, a reviewer’s “good reputation in the community” (Crowley & Hawhee, 2008, p. 198), develops over time. Separating the two helps upon encountering situations in which a reviewer with a good reputation contributes a review that fails to demonstrate (to invent) credibility. For example, users might perceive a review containing spelling and grammatical errors to be carelessly and hurriedly written, and they then might reconfigure their perception of the reviewer’s situated credibility based on this (poor) invented credibility. Alternatively, a reviewer who lacks a reputation within a discourse community could begin the process of building one by inventing credibility in his or her first review.

Situated Credibility. As mentioned above, situated credibility refers to reputation, a history of good practice in the community. Reviewers build situated credibility by contributing to the site in helpful ways. Over time, others in the community develop trust in the reviewer’s sincerity and goodwill. As Hu *et al.* (2008), citing Chiles and McMackin (1996) pointed out, “Trust reflects all of the historical trustworthy behaviors exerted by the entity and is a strong signal of reliability to third parties, no matter whether they have or have not conducted transactions with the entity before” (p. 205). A reviewer’s situated credibility can manifest itself in a variety of ways. On the review site Epinions.com, for example,

reviewers developed a “web of trust”—a set of users who categorized a reviewer as trusted.

In a study of the effects of reviewer profile characteristics on credibility, Xu (2014) manipulated reviewer reputation by manipulating the number of members who indicated trust in that reviewer and found that a large number of trusted members “led to more perceived review credibility than [a] small number of trust members” (p. 141). In addition, Xu found a relationship between members who trusted a reviewer and review valence. In the case of positive reviews, the number of members who trusted the reviewer did not matter to users, but in the case of negative reviews, that number did matter. Users considered a negative review to be more credible when a larger number of members trusted the reviewer than a smaller number (p. 141). Situated credibility then, though perceived at a single point in time, develops over time as reviewers build a profile for themselves and add useful content. Users’ perceptions of credibility and, therefore, quality stem from a reviewer’s longitudinal commitment to a generating content with sincerity and goodwill.

Researchers have also examined the effects of situated credibility on review helpfulness in terms of the helpfulness of a reviewer’s previous reviews. O’Mahony and Smyth (2010) found that the helpfulness of a reviewer’s previous reviews was a strong predictor of review helpfulness (p. 165). Hu *et al.* (2008) examined the effect of situated credibility by accounting for the total number of useful votes a reviewer received on prior reviews and dividing that number by the reviewer’s total number of reviews (p. 208). They found that the quality of a reviewer as measured by ratio of helpful to total reviews matters to a review’s impact on sales: “Consumers react to favorable and unfavorable news differently when the review is written by a higher quality reviewer”; however, they did not find the same effect on sales for lower quality reviewers. In the case of lower quality reviewers, participants were “indifferent” to the reviews (p. 209). Technical communicators looking to gauge review quality should look to a reviewer’s history—his or her track record of producing content that users perceive to be useful. In the case of product reviews, past behavior predicts users’ perceptions of a reviewer’s current performance.

Studying expertise—another component of credibility (Hovland, Janis, & Kelley, 1953; Hu, Liu, & Zhang, 2008)—as opposed to trustworthiness, Lim

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and Van Dear Heide (2014) studied Yelp, looking at the effects of a reviewer's number of friends and number of reviews. They found that Yelp users perceived reviewers with more friends and more reviews as having greater expertise/competence. In addition to recognitions that reviewers earn, on some sites, most notably on Amazon.com, reviewers can build situated credibility by attaching their real names to their reviews and by disclosing other identity-descriptive information on their profile pages (one click away from their reviews). Forman, Ghose, and Wiesenfeld (2008) found that such disclosure of identity information positively and significantly associated with users' perceptions of review helpfulness and with sales of the product under review (p. 308). With ready access to reviewers' reputations as trustworthy experts, users are more likely to perceive quality in reviewers' content.

Invented Credibility. In relation to invented credibility, Mackiewicz and Yeats (2014) tested the extent to which reviewers' statements, or assertions, of their expertise about the product or matters related to the product (such as familiarity with the brand) affected perceptions of review credibility. The study built on Mackiewicz's (2010) description and analysis of assertions of expertise in product reviews and on Connors, Mudambi, and Schuff's (2011) study of statements of expertise. Connors, Mudambi, and Schuff (2011) found that expertise statements had an effect; participants perceived a review with the expert statements as a greater aid in making a purchasing decision, as providing greater insight into the product, and as more helpful than a review without them (p. 5). They write, "Consumers may pay more attention to a self-described expert just on the basis of that declaration [of expertise]" (p. 7). This review of Adams A12 OS Hybrid golf clubs illustrates such a declaration:

I have tried may os iron from Taylormade, Callaway, Mizuno, nothing really helped. You can only work on your swing so much, it pretty much is what is is. I decided to try these clubs, and what a difference. I am 56 years old with back and shoulder probs. so I bought graphite shafts. The ball gets airborne so easy with good impact, distance is acceptable, and the 4-6 hybrids are also easy to hit. I wish I would have tried Adams before.

This reviewer asserts expertise stemming from experience from using similar products from several other brands. Mackiewicz and Yeats (2014) found that a statement about the reviewer's prior experience with a similar product had a positive effect on participants' perceptions of review credibility. They also found that a statement about expertise gained from conducting research (for example, online research on the product) had a positive effect on perceptions of credibility as well. Technical communicators can look (typically) to the first or second statements in reviews to determine whether the reviewer has attempted to invent credibility through assertions of expertise.

Finally, while not investigating invented credibility per se, Pan and Zhang (2011) investigated the role of reviewer "innovativeness," specifically, the relationship between reviewers' innovativeness and review helpfulness. They operationalized innovativeness with 21 attributes closely associated with innovators, for example, education, comfort with abstraction, attitude toward change, ability to cope with uncertainty, knowledge of innovations or new products (pp. 610–611). They found a U-shaped relationship between innovativeness and helpfulness. That is, moderately innovative reviewers were most helpful. These findings suggest that reviewer innovativeness—as expressed in a review—makes a difference to users' perceptions of quality. More research will show which of these 21 characteristics of innovativeness technical communicators should look for as they assess review quality.

Section Conclusion. In sum, technical communicators can locate review quality by looking for (1) reviews by reviewers with good reputations and (2) reviews in which reviewers assert expertise, especially by asserting prior experience with similar products and by asserting that they have conducted research on the product.

Conformity

Two types of review conformity influence quality: (1) a review's external conformity, the extent to which its rating corresponds to the rating consensus of surrounding reviews and (2) a review's internal conformity, the extent to which a review's text corresponds to its star (or other) rating.

External Conformity. External conformity is the extent to which a product review's evaluation diverges from or norms with the average evaluation of other reviews of the same product. This component of review

quality reflects findings supporting what researchers call “the conformity hypothesis”—the idea quality does not solely reside within a review but instead arises from how that review accords with other reviews. As Korfiatis, García-Bariocanal, and Sánchez-Alonso (2012) write, “Reviews closer to consensus may be considered more helpful by potential consumers than those exhibiting extremes of opinion” (p. 206). Adhering to the norm appears to generate perceptions of quality. However, Danescu-Niculescu-Mizil *et al.*’s study (2009) complicates this broad statement somewhat. They found a slightly modified version of the conformity hypothesis to hold in their study of over one million reviews on Amazon.com with at least 10 helpfulness votes. They found that slightly negative reviews that deviated from the average product rating were less helpful than slightly positive reviews that deviated from the average (p. 143). Technical communicators looking to identify quality reviews might determine the average star rating for a given product and then look to reviews with that rating.

Internal Conformity. While a number of researchers have examined the role of external conformity in determining perceptions of review quality, Schlosser (2011) examined a review’s internal consistency—the consistency between the review’s star rating for the product and the review text. She found participants perceived reviews with two-sided arguments (that is, reviews that showed balance) as more helpful when the star rating was moderately favorable. If the review rating was extremely favorable, users did not perceive a two-sided argument as helpful (Schlosser, 2011, pp. 230–231; see also Schlosser, 2005). This 3-star (moderate) review of a 20-piece flatware set shows internal consistency in that it examines pros and cons about the product, a two-sided argument:

Buying things online is always a risk, and upon receiving these I found some good and bad.

I actually really like this set: the pieces have a smooth, modern, yet industrial style that I love. Most of the pieces (see below) feel good in the hand and have a nice, solid weight to them. However I took off a couple of points for the following reasons: (1) the online listing doesn’t tell you what a little piece of paper that comes with them instructs: they need to be “hand dried” to keep them looking this way. ...

- (2) the salad forks are TINY! Teeny tiny, to be exact. I set them aside to be used as cocktail forks if I ever have need for such a thing. The smaller spoons are bordering on too small, but I think they will be fine.
- (3) the back of each piece (on the silver part not the handles) states “Stainless Steel 18/0 China” in black, obvious letters. It would have been nice if they could have printed this info (it’s probably required) somewhere more discreet.

This reviewer leads off with positive evaluation of the flatware (“I actually really like this set...”), but then moves on to delineate three problems. The balance of pros and cons, though, jibes with the 3-star rating that the reviewer assigned to the product. The text and the rating create internal conformity.

Section Conclusion. To sum up, technical communicators can look for conformity—both external and internal—to identify quality reviews. They can look for (1) reviews with star ratings comparable to the average star rating and (2) reviews with text that backs up their star ratings—whether positive, negative, or moderate.

Readability

A fifth component of review quality is readability. As pointed out by Riley and Mackiewicz (2011), the term “readability” has (at least) two meanings. First, the word refers to the extent to which a reader can comprehend, or cognitively process, a text. Readability formulae such as the Flesch-Kincaid Grade Level and Flesch Reading Ease (which come bundled with Microsoft Word) provide one measure (albeit a disputed one) of text comprehensibility. Second, “readability” also refers to the extent to which users perceive a document as comfortable to read, a characteristic stemming from a document’s visual design. For example, most people find it uncomfortable to read long stretches of small type, especially when that stretch of text suffers from insufficient leading as well. Product reviewers control the first type of readability; they can write and edit their reviews so that users can easily understand them. However, product reviewers have little control over the visual design of their reviews—how their reviews will appear on the screen. They don’t choose the typeface or leading of their review text. They also don’t decide where or how their reviews will display on the webpage, for example, whether an entire review displays at once or whether readers have to click on a “more”

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or similar link to see the complete review. They can, however, usually control whether to use bold or italics, whether to use headings, and whether to insert white space between lines.

To determine whether better readability in the first sense, the sense of comprehensibility, relates to perceptions of review helpfulness, researchers have used a variety of readability formulae to analyze review text. Korfiatis, García-Bariocanal, and Sánchez-Alonso (2012) applied four readability formulae and found a positive relationship between readability and helpfulness. Ghose and Ipeirotis (2011) used six readability formulae to analyze review text and, similar to Korfiatis, García-Bariocanal, and Sánchez-Alonso (2012), found that greater readability “has a positive and statistical impact on review helpfulness” (p. 1510). These findings suggest that improving readability will improve helpfulness.

However, testing a possible relationship between product sales and readability scores, Korfiatis, García-Bariocanal, and Sánchez-Alonso (2012) found a relationship between higher readability scores (suggesting less-readable texts) and higher product sales. They explain their finding this way: “This [negative relationship between readability and product sales] is likely to happen if such reviews are written in more authoritative and sophisticated language” (p. 1504). Less readable texts—if they convey expertise and certainty—might more readily persuade users to purchase the product. O’Mahony and Smyth (2010) got a similar result in their four-formulae analysis of the helpfulness of Amazon and TripAdvisor reviews: “Helpful review texts required a higher degree of reading ability on the part of the reader to understand” (p. 166). Such findings indicate a complex relationship between readability and helpfulness score: reviewers’ use of specialized language might in some cases motivate users to make a purchase more readily than reviews containing fewer instances of specialized language.

The following review exemplifies readability in online reviews. It contains 821 words (an excerpt appears below), with an average of 14.7 words per sentence (average sentence length). The Flesch-Kincaid Grade Level is 7.1, and the Flesch Reading Ease score is 69.7, which means most 13 year olds could understand it.

The good:

Fast CPU makes easy work of complicated word, excel, and power point documents. The fifth low power

companion core runs most tasks so the four main cores seldom get used which really lowers the power usage.

GPU renders 3d games with playable frame rates and details. Easily displays Blu-Ray movies in 1920x1080 at full Blu-ray data rates so the quality you see is the same as what you see on your TV....

The bad:

No separate USB port. Manufacturers, when are you going to realize we need separate USB ports!

Like Apple, there’s a big connector on the bottom. Tablet comes with a 40 pin to USB adapter for connecting to a computer or USB host. You have to use the USB host dongle or buy the dock to get USB host functionality. ...

The strange:

Dock is a full laptop sized keyboard with a touch pad and either one or two USB host ports. It also has a large battery that can run both it and the tablet for a reported run time of 17 hours! That’s great but it basically converts it into a small laptop, which can be bought cheaper, has more storage, and runs PC applications. I guess it depends on your applications on what you need....

Even though this review contains some fairly technical terminology (for example, GPU, 40 pin to USB adapter), it mainly employs common words. It also uses active voice, another facilitator of text comprehension. Besides being fairly comprehensible, this review is also comfortable to read. The reviewer chunked content with white space and organized with headings. These formatting choices are easy to implement and help enhance the user’s reading experience.

Section Conclusion. Technical communicators who want to identify quality reviews can assess readability—both varieties. They can look for reviews that employ white space and headings and are thus more comfortable to read. They can also look for reviews that users can readily understand (as measured through readability metrics). Even reviews that employ some specialized terminology (and thus signal expertise) should facilitate users’ comprehension.

User Characteristics

As I mentioned earlier, another variable has an impact on the extent to which users will perceive quality in a review:

user characteristics. However, unlike the five quality components described above, this component is one that technical communicators cannot readily influence. Even so, research suggests the importance of users' goals and traits to their perceptions of a particular review. Zhu and Zhang (2010) studied the effect of users' Internet experience; they found that product reviews strongly influenced the purchasing decisions of consumers with relatively greater Internet experience. Ibrahim, Suki, and Harun (2014) studied the interaction between product reviews and consumers' perceived risk of shopping online. They broke the construct of perceived risk into five types: financial risk, performance risk, time-loss risk, psychological risk, and source risk. They found that product reviews significantly moderated the positive relationship between perceived risk and unwillingness to make an online purchase. Zhang, Craciun, and Shin (2010) studied the role of users' goals for a product on a review's persuasiveness. In their study, consumers showed negativity bias for prevention products—products that help people avoid negative outcomes—as opposed to goal-promoting products—products that move consumers toward positive outcomes (p. 1337). They write, “The consumption goals that consumers associate with the reviewed product trigger consumers' regulatory foci, which, in turn, bias consumers' evaluations of positively and negatively valenced product reviews” (p. 1340). Although user characteristics play a role in perceptions of review quality, technical communicators have no control over user characteristics such as familiarity with the Internet or purpose in investigating and, potentially, purchasing a product. Further research might investigate users' perceptions of review quality as they encounter reviews based on their browsing and purchasing behaviors and the effects of messages aimed at ameliorating users' perceptions of risk.

Conclusions and Implications

Document quality hinges on context—no technical communicator would argue with that. However, certain characteristics of product review quality that appear to apply across contexts shake out from the extant research. These characteristics together build upon Shelby's (1988) definition of a quality technical document: one that bridges individual and collective tastes, conforms to expectations, and is fit to use (p. 392). Although technical communicators cannot readily ascertain or

influence the characteristics of review users, they can move beyond use of reviews' helpfulness votes to identify other components of quality reviews and then mine those reviews for information.

In addition, being able to assess review quality beyond the problematic measure of helpfulness votes enables technical communicators charged with developing and managing their organizations' UGC to improve the content that users contribute. And as Frith (2014) shows, in taking on responsibility for their organizations' UGC, technical communicators have an opportunity to put knowledge and skills that they already possess to work in new contexts. Technical communicators who work with content contributors—reviewers—can help them improve their reviews in a variety of ways. They can help reviewers improve review informativeness, for example, by encouraging them to state their recommendations explicitly and by encouraging them to discuss the extent to which products met their expectations. They can help reviewers calibrate the valence of their reviews, for example, the strength with which they convey positivity toward search versus experience products. They can help reviewers improve their credibility by ensuring that they discuss their relevant expertise, particularly research on the product that they have conducted and their prior experience with similar products. They can readily influence a review's internal conformity by working with reviewers to ensure that their review text corresponds to the assigned star rating. And they can also help reviewers revise and edit to improve readability in both senses of the term.

And seizing such opportunities to engage with product reviewers and other users who contribute content, it seems, will become more important as the amount of UGC grows. As the mass of UGC grows, the need to learn from it—for example, product trends and consumers' ideas for products—will grow as well. In addition, as the mass of UGC grows, the need to improve it—for example, making it more informative and more readable—will also grow. In this article, I have delineated components of quality in product reviews and described how technical communicators can locate those components to mine reviews and to work with reviewers to improve the quality of the content they provide. By using their knowledge and skills in new ways, technical communicators can stay relevant and necessary as organizations rely more and more heavily on UGC.

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Acknowledgment

I am grateful to Bazaarvoice, Inc., and particularly Alex Barrera, product manager in data and analytics, for giving me access to this corpus of reviews. I am also most grateful to my friend and coauthor Dave Yeats for our ongoing research on product review quality.

References

- Adobe Systems Inc. (2011). Multi-channel, rich, and social: Exploring the illustrative edge of Adobe Technical Communications 2.0. *ISTC Communicator*. Retrieved from <https://www.adobe.com/go/tcstechillustration>.
- Baumeister, R. F., Bratslavsky, E., Finkenauer, C., & Vohs, K. D. (2001). Bad is stronger than good. *Review of General Psychology*, 5(4), 323–370.
- Cao, Q., Duan, W., & Gan, Q. (2011). Exploring determinants of voting for the “helpfulness” of online user reviews: A text mining approach. *Decision Support Systems*, 50(2), 511–521.
- Chevalier, J., & Mayzlin, D. (2006). The effect of word of mouth on sales: Online book reviews. *Journal of Marketing Research*, 43(3), 345–354.
- Connors, L., Mudambi, S. M., & Schuff, D. (2011). Is it the review or the reviewer? A multi-method approach to determine the antecedents of online review helpfulness. In *2011 44th Hawaii International Conference on System Sciences* (pp. 1–10). Piscataway, NJ: IEEE.
- Crowley, S., & Hawhee, D. (2008). *Ancient rhetorics for contemporary students* (4th ed.). New York, NY: Longman.
- Danescu-Niculescu-Mizil, C., Kossinets, G., Kleinberg, J., & Lee, L. (2009). How opinions are received by online communities: A case study on Amazon.com helpfulness votes. In *WWW 2009: Proceedings of the 18th International Conference on World Wide Web* (pp. 141–150). New York, NY: ACM.
- Feldman, S. (1966). Motivational aspects of attitudinal elements and their place in cognitive interaction. In S. Feldman (Ed.), *Cognitive consistency: Motivational antecedents and behavioral consequents* (pp. 75–108). New York, NY: Academic Press.
- Fiske, S. (1993). Social cognition and social perception. *Annual Review of Psychology*, 44(1), 155–194.
- Fiske, S. T., & Taylor, S. E. (1991). *Social cognition* (2nd ed.). New York, NY: McGraw-Hill.
- Forman, C., Ghose, A., & Wiesenfeld, B. (2008). Examining the relationship between reviews and sales: The role of reviewer identity disclosure in electronic markets. *Information Systems Research*, 19(3), 291–313.
- Frith, J. (2014). Forum moderation as technical communication: The social web employment opportunities for technical communicators. *Technical Communication*, 61(3), 173–184.
- Ghose, A., & Ipeirotis, P. G. (2011). Estimating the helpfulness and economic impact of product reviews: Mining test and reviewer characteristics. *IEEE Transactions on Knowledge and Data Engineering*, 23(10), 1498–1512.
- Gupta, P., & Harris, J. (2010). How e-WOM recommendations influence product consideration and quality of choice: A motivation to process information perspective. *Journal of Business Research*, 63(9–10), 1041–1049.
- Hovland, C., Janis, I., & Kelley, H. (1953). *Communication and persuasion*. New Haven, CT: Yale University Press.
- Hu, N., Liu, L., & Zhang, J. (2008). Do online reviews affect product sales? The role of reviewer characteristics and temporal effects. *Information Technology Management*, 9(3), 201–214.
- Hu, N., Zhang, J., & Pavlou, P. A. (2009). Overcoming the J-shaped distribution of product reviews. *Communications of the ACM*, 52(10), 144–147.
- Ibrahim, S., Suki, N. M., & Harun, A. (2014). Structural relationships between perceived risk and consumers’ unwillingness to buy home appliances online with moderation of online consumer reviews. *Asian Academy of Management Journal*, 19(1), 73–92.
- Kanouse, D. E., & Hanson, L. R. (1972). Negativity in evaluations. In E. E. Jones, D. E. Kanouse, H. H. Kelley, R. E. Nisbett, S. Valins, & B. Weiner (Eds.), *Attribution: Perceiving the causes of behavior* (pp. 47–62). Morristown, NJ: General Learning Press.
- Korfatis, N., García-Bariocanal, E., and Sánchez-Alonso, S. (2012). Evaluating content quality and helpfulness of online product reviews: The interplay of review helpfulness vs. review content. *Electronic Commerce Research and Applications*, 11, 205–217.

- Liu, H., Lim, E.-P., Lauw, H. W., Le, M.-T., Sun, A., Srivastava, J., & Kim, Y. A. (2008). Predicting trusts among users of online communities: An Epinions case study. In *Proceedings of the 9th ACM Conference on Electronic Commerce* (pp. 310–319). New York, NY: ACM.
- Liu, J., Cao, Y., Lin, C.-Y., Huang, Y., & Zhou, M. (2007). Low-quality product review detection in opinion summarization. In *Proceedings of the Joint Conference on Empirical Methods in Natural Language Processing and Computational Natural Language Learning* (pp. 334–342). Stroudsburg, PA: Association for Computational Linguistics.
- Mackiewicz, J. (2010). Assertions of expertise in online reviews. *Journal of Business and Technical Communication*, 24(1), 3–28.
- Mackiewicz, J., & Yeats, D. (2014). Product review users' perceptions of review quality: The role of credibility, informativeness, and readability. *IEEE Transactions on Professional Communication*, 57(4), 309–324.
- Mackiewicz, J., Yeats, D., & Thornton, T. (in review). The impact of review environment on review credibility. *IEEE Transactions on Professional Communication*.
- McGlohon, M., Glance, N., & Reiter, Z. (2010). Star quality: Aggregating reviews to rank products and merchants. In *Proceedings of the Fourth International AAAI Conference on Weblogs and Social Media* (pp. 114–121). Palo Alto, CA: AAAI Press.
- Metzger, M. J., Flanagin, A. J., & Medders, R. M. (2010). Social and heuristic approaches to credibility evaluation online. *Journal of Communication*, 60(3), 413–439.
- Mudambi, S. M., & Schuff, D. (2010). What makes a helpful online review? A study of customer reviews on Amazon.com. *Management Information Systems Quarterly*, 34(1), 185–200.
- O'Mahony, M. P., & Smyth, B. (2010). A classification-based review recommender. *Knowledge-Based Systems*, 23(4), 323–329.
- Ong, T., Mannino, M., & Gregg, D. (2014). Linguistic characteristics of skill reviews. *Electronic Commerce Research and Applications*, 13(2), 69–78.
- Ott, M., Choi, Y., Cardie, C., & Hancock, J. T. (2011, June). Finding deceptive opinion spam by any stretch of the imagination. In *Proceedings of the 49th Annual Meeting of the Association for Computational Linguistics: Human Language Technologies-Volume 1* (pp. 309–319). Stroudsburg, PA: Association for Computational Linguistics.
- Otterbacher, J. (2011). Being heard in review communities: Communication tactics and review prominence. *Journal of Computer-Mediated Communication*, 16(3), 424–444.
- Pan, Y., & Zhang, J. Q. (2011). Born unequal: A study of the helpfulness of user-generated product reviews. *Journal of Retailing*, 87(4), 598–612.
- Papathanassis, A., & Knolle, F. (2011). Exploring the adoption and processing of online holiday reviews: A grounded theory approach. *Tourism Management*, 32(2), 215–224.
- Rello, L., & Baeza-Yates, R. (2012). Social media is NOT that bad! The lexical quality of social media. In *Proceedings of the Sixth International AAAI Conference on Weblogs and Social Media* (pp. 559–562). Palo Alto, CA: AAAI Press.
- Riley, K., & Mackiewicz, J. (2010). *Visual composing: Document design for print and digital media*. Upper Saddle River, NJ: Prentice Hall.
- Roggeveen, A. L., & Johar, G. V. (2002). Perceived source variability versus familiarity: Testing competing explanations for the truth effect. *Journal of Consumer Psychology*, 12(2), 81–91.
- Rozin P., & Royzman, E. B. (2001). Negativity bias, negativity dominance, and contagion. *Personality and Social Psychology Review*, 5(4), 296–320.
- Schindler, R. M., & Bickart, B. (2012). Perceived helpfulness of online consumer reviews: The role of message content and style. *Journal of Consumer Behaviour*, 11(3), 234–243.
- Schlosser, A. E. (2005). Posting versus lurking: Communicating in a multiple audience context. *Journal of Consumer Research*, 32(2), 260–265.
- Schlosser, A. E. (2011). Can including pros and cons increase the helpfulness and persuasiveness of online reviews? The interactive effects of ratings and arguments. *Journal of Consumer Psychology*, 21(3), 226–239.
- Sen S., & Lerman, D. (2007). Why are you telling me this? An examination into negative consumer reviews on the web. *Journal of Interactive Marketing*, 21(4), 76–94.
- Shelby, A. N. (1998). Communication quality revisited: Exploring the link with persuasive effects. *Journal of Business Communication*, 35(3), 387–404.

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- Sparks, B. A., & Browning, V. (2011). The impact of online reviews on hotel booking intentions and perception of trust. *Tourism Management*, 32(6), 1310–1323.
- Tenenbaum, I. (2013, July 9). Brands that dominate with user-generated content. (Web log comment). Retrieved from <http://www.imediaconnection.com/content/34507.asp#singleview>.
- van Schaik, P., & Ling, J. (2009). The role of context in perceptions of the aesthetics of web pages over time. *International Journal of Human-Computer Studies*, 67(1), 79–89.
- WolframAlpha Computational Knowledge Engine. (2014). Average English word length. Retrieved from <http://www.wolframalpha.com>.
- Yang, J., & Mai, E. S. (2010). Experiential goods with network externalities effects: An empirical study of online rating system. *Journal of Business Research*, 63(9), 1050–1057.
- Yeats, D., & Mackiewicz, J. (2014, May). Perceptions of product review quality: Testing credibility, informativeness, and readability. Panel *Trust and credibility on the internet*, conducted at the International Communication Association conference, Seattle, WA.
- Zajonc, R. B. (1968). Attitudinal effects of mere exposure. *Journal of Personality and Social Psychology*, 9(2), 1–27.
- Zhang, J. Q., Craciun, G., & Shin, D. (2010). When does electronic word-of-mouth matter? A study of consumer product reviews. *Journal of Business Research*, 63(12), 1336–1341.
- Zhu, F., & Zhang, X. (2010). Impact of online consumer reviews on sales: The moderating role of product and consumer characteristics. *Journal of Marketing*, 74(2), 133–148.

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Manuscript received 17 October 2014; revised 5 February 2015; accepted 13 February 2015.

What User Forums Teach Us about Documentation and the Value Added by Technical Communicators

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Abstract

Purpose: To describe the practice of technical documentation on software user forums and consider what value technical communicators add when they are no longer solely responsible for generating help content. Argue that documentation needs undergo a shift as users' tasks expand beyond what is directly accommodated in the software's design. Users no longer need stabilization knowledge (knowledge of what software is designed to do) but possibility knowledge (knowledge of what the software is capable of doing).

Method: Interviews with moderators and frequent posters on four software user communities for Microsoft Excel, Adobe InDesign, Mozilla Thunderbird, and GIMP. Questions probe the participants' sense of what makes helpful contributions on software user forums. Answers are coded thematically.

Results: Moderators and frequent posters stress the importance of maintaining high quality content and high quality social interactions. High quality content is that which is credible and situationally authentic, expansive, and targeted. High quality interactions are those that effectively involve multiple members of a community and distribute responsibility for addressing user problems to those community members with the most suitable experience/expertise.

Conclusions: While community members may adequately generate the necessary help content, technical communicators are needed for abilities that are also strongly associated with the profession but that often seem of secondary importance. Technical communicators may be skilled moderators who can use their genre knowledge to correct, clarify, and contextualize software problems; use their interpersonal skills to help maintain ties among members of the community; and use their knowledge of text usability and organizational communication to create infrastructure for storing and retrieving help content that is performed in the user community.

Keywords: user communities, documentation, moderation, information architecture

Practitioner's Takeaway

- Technical communicators cannot generate enough specialized help documentation to meet all user demand, but a community of users can. Technical communicators can help maintain the community.
- Technical communicators understand how to articulate tasks effectively and how to structure useful solutions.
- Technical communicators are skilled at interpersonal and organizational communication, which helps hold the software user community together, ensuring that it continues to function as a vibrant and credible source of documentation.

User Forums and Technical Communicators

Introduction

When new software products are developed and released, there follows a period in which users learn the software's designed operation. Traditionally, documentation assisted the user in this cultivating this knowledge. And if the software addresses a need indispensably, then there may come a point at which users permanently adapt their work to software, or any technologies, that have become ubiquitous and essential. Desktop publishing and Internet technologies are good examples. Each results in a reorganization of people and resources around it, rippling out to touch other activities. The point of observing that technologies become semi-transparent components of cognitive, social, and professional infrastructures is that users reach a point when their activities are not isolated to a particular technology but are instead distributed across the infrastructure of which that technology is a piece. This change marks a shift in the location and nature of tasks with which users need support. Consider the illustration in Figure 1.

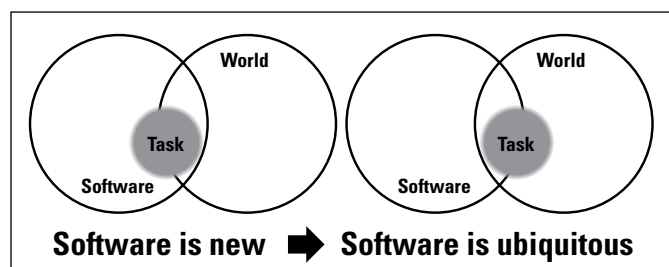


Figure 1. Task Shift

The change is subtle: early in a technology's development, the tasks we accomplish with it often fall within the sphere of the software's programming, within the range of tasks that developers anticipated and that technical communicators documented. At this threshold, the software meets user needs and functional expectations, and assuming no change in the nature of the tasks supported, consumers become uninterested in further features and development (see Norman, 1998, p.33). We know, however, that tasks shift as the exigencies, constraints, and contexts change. In the interim, between the shift in tasks and the development of more specialized technologies, users make do with what they have and fit existing technologies into new roles by using them in coordination with other technologies. For example,

we use email for correspondence but now also for file transfers, for collaborations, for reminders. It is all still correspondence, but the tasks get fuzzier around the edges as the task goals shift from models assumed in the email client's programming.

Task shift is the exigence for innovation and development. As tasks shift, existing technologies fit the task goals imperfectly and require innovation. But this interstitial period is one in which users need a lot of support and traditional documentation is often of little help. At one level, the problem is related to genre and the ways that the genre of software documentation has stabilized over time, as the rhetorical situations calling for that kind and form of information stayed the same (see Van Der Meij, 2009). The social action that recurs in the genre of software documentation (see Miller, 1984 for this use of "genre") is that of a single user interacting with a finite range of software interfaces to accomplish known tasks. A testament to the stability of the software documentation genre is its instantiation in assistive technologies such as structured writing tools that reinforce a concept/task/reference model of help topics. Task shift destabilizes help content, perhaps not the structure of concept, task, and reference but instead the scope of information that makes up salient concepts, appropriate tasks, and useful references.

Traditional documentation supports a particular kind of learning, aimed at creating what Engeström calls "stabilization knowledge" (2007, p. 271), knowledge that freezes or standardizes and creates an abstraction of an otherwise messy reality. Traditional documentation does this well and appropriately in early stage product adoption; people need to learn the standard operations. As tasks shift, learning needs shift toward what software is capable of doing in relation to other technologies, in an increasingly complex web of task-based technological dependencies. Information supporting these shifted tasks must be more plastic, where "inputs and outputs are less well defined; and information is less targeted" (Brown & Duguid, 2000, p.95).

In support of shifted or shifting tasks, there is a need for "possibility knowledge" or agent-based knowledge that is developed and deployed in the moment (Engeström, 2007, p. 271). Possibility knowledge is destabilized and deals with the uncertainty of the task situation, the network-like confluence and influence of other factors (p. 272). Engeström's example is analogous to ours. He described a task where a patient

visits a doctor for diagnosis and treatment of a standard medical condition that is uncomplicated by underlying chronic conditions or addictions and whose treatment is uncomplicated by drug interactions, insurance difficulties, immunities, and the like. Likewise, documentation written as stabilizing knowledge assumes uncomplicated tasks, for instance running a report that is uncomplicated by the nature of the format or privacy of the data going into the report, uncomplicated by a variety of intersecting analyses and motives that the report must address, and uncomplicated by the various technological and social connections across which that information must be shared.

When there are multiple, intersecting exigencies that touch upon and constrain one another, the tasks shift and the standard or genred responses do not hold; they must destabilize into more flexible and raw streams of knowledge that rely on the agent or the practitioner to display, represent, and assemble (see Hart-Davidson, 2013, p. 59) in a way that responds to the particularities of the situation.

For this kind of help, users often turn to user forums and other sources of crowd-based instruction, which are capable of being individualized and dynamically created (see Frith, 2014). User forums act as a kind of performed documentation or documenting space by creating possibility knowledge through reconstruction of the situation out of which tasks have shifted. This process of reconstructing the rhetorical situation is a social one (Bawarshi & Reiff, 2010, p.70); it takes place within the context of an activity and within the social and historical and technological contexts of action (see “polycontextuality” in Engeström et al., 1995; Spinuzzi, 2007). Under these rhetorical conditions, the role of the technical communicator is to assist in the construction of the rhetorical situation to which a task has shifted and to which a user is oriented.

This role is one that Selber (2010) anticipated when discussing the shift from print documentation to electronic documentation. He argued that the transition to electronic documentation and just in time, highly individualized learning is that the nature of what technical communicators manage has changed. With traditional documentation, technical communicators managed publications. As the rhetorical situations calling for documentation grew more complex and networked, more attention shifted to managing flexible units of content like tasks and concepts. In

electronic documentation sets, the work of technical communicators has shifted toward the management of knowledge (Selber, 2010, p.112) and, importantly, to managing the sources of that knowledge, which is the community or social of which Bawarshi and Reiff wrote. The shift has been recognized by others as well, including Frith (2014) who uses the occasion to reframe the work of technical communicators as curators, organizers, and facilitators of this content (2014, pp. 179-180).

This research elaborates the position that technical communication addressees the management of knowledge resources, the orchestration of the crowd which, when organized, can leverage considerable intellectual power (see Shirky, 2011; Sunstein, 2006) given proper direction and ability to distribute the cognitive effort to members of the community who are best capable of handling it (see Hutchins, 1995). This is unfamiliar ground for many technical communicators, and it marks a foray into areas of work that we are not accustomed to contemplating. The question concerning us here is what this knowledge and work looks like. How do people acting as technical communicators encourage content that addresses problems arising from shifted tasks and cultivate an environment in which that help can be performed and practiced?

We can see this work on display in the various user forums to which users of software and other technologies go to engage in possibility learning. Sometimes technical communicators work in those settings, either out of enjoyment or on behalf of the companies for whom they otherwise produce standard written documentation. But as more people are moving to forums and other interactive and social settings for assistance, it appears important to consider what role technical communicators could be playing as stewards of information and not the sole creators of that content. As such, this article takes up the following:

- What knowledge is exhibited and encouraged in forums?
- How do people manage that knowledge?
- Where does the work of information creation and community cultivation overlap with the skills typically associated with technical communication?

Content, as I hope to show, is not the problem. We have plenty of it, but the people who are the most

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skilled at and capable of generating the raw content are going to be those who are living the shifted tasks. It's time that we stop thinking that our jobs are to provide content and instead look at that work as organizing content providers, and accommodating that information to others. We learn about this function by observing how members and moderators of software user communities already adopt these roles as citizen technical communicators. To get there, we must first consider how user forums are altering our awareness of what we document and how.

Methods

I sampled content from four busy user forums for four popular software packages: Microsoft Excel, Adobe InDesign, Mozilla Thunderbird, and GIMP. This research was declared exempt from IRB (#1774). A research assistant and I filtered the threads first by number of visits, then by post count. Our aim was to find the most frequently viewed and most active threads. Often, these threads were long and active because they originated from complex problems.

These kinds of problems showcase what is most valuable about the user forum as a source of documentation: it is a performance of help that is orchestrated by community members, who play the role of technical communicators. We can see in those interactions the kind of work that trained technical writers would excel at: eliciting knowledge, managing the output, shaping the products of those exchanges into usable artifacts for community members (tutorials, quick starts, FAQs, knowledge base articles). I focused data collection on the members of the community who had earned status, variously as elders, gurus, or moderators. These are the people who have the credibility and authority to weigh in significantly on a topic and to alter the shape of a conversation. In effect, these people acted as technical communicators, just as any contributor could, but they had been bestowed with authority and stature by the community. Upon identifying these members of the community, I approached 20 moderators/senior community members via private message about their willingness to be interviewed for this research. Hereafter, I will just refer to both groups collectively as moderators since that is the authority and privilege that they held. The questions from which all interviews started were:

- Why do you participate on this forum?
- How do you use the forum?
- What do you consider to be the qualities of helpful contributions to this forum?
- How would you describe the role of the community/forum moderator?

Depending on the answers, I would follow up with additional questions.

The interviews were conducted by phone and email (especially in situations where time differences prohibited synchronous communication). Following techniques of first cycle coding of topics (see Saldaña, 2009), I coded for topical themes. Through iterative cycles of coding, I refined the codes by splitting and combining codes until all of the data were accounted for. The conversations gravitated toward three particular issues that defined helpful content on the forum: the content, the interactions among community members, and the role of the forum moderators.

Results: The Work of Moderation and Technical Communication

In this section, I offer an overview of themes in the interview data, in terms of the questions raised earlier: what knowledge is exhibited and encouraged in the forums and how is that knowledge managed? After coding the data, two general concerns emerged as driving forces that guided how moderators managed the forums. The first is that there were issues of controlling the quality of the content, mostly concerning the quality of the contributions made by the community in response to a query. Another dimension of concern was with the quality of the interaction, the interoperation of the community as a collection of like-minded individuals and the need to enculturate newcomers to the practices and predilections of the community. Quality interactions, shaped by subtle moderator influence can lead to both better questions and also to a more congenially-distributed sharing of responsibility for articulating and trying out answers among community members. The last area of focus was the roles that forum moderators played both as technical communicators and as those who coordinated the efforts of the user community.

Knowledge Content Created Quality Content Is Credible And Authentic.

Traditionally, technical communicators have defined their contributions to product documentation around the production of content, writing the concepts, tasks, and references that make up the documentation. In a user community, however, content is not in short supply. There is an overgrowth of content that requires cultivation to be useful to those who have sought it and those who might come upon it through future searching of the community forums. The moderators and frequent posters I interviewed revealed considerable concern with managing the quality of the information and saw doing so as a principal part of their work. Within this broad category of work, a number of themes arose. One of the draws for users who post questions is the people who are offering the answers, people who are interested in the technology and who use it on a regular basis. When they make contributions, it is clear that they do so out of experience and the ability to understand the situations users find themselves in.

Whether out of pride or pure altruism, the software forums are frequently seen as a place for the most knowledgeable of users to demonstrate their depth of knowledge and experience (EF3). Users appear to recognize a difference in the quality of help that appears in different locations. Where the embedded help files for some software might be seen as “generally poor” (EF4) the more chaotic presentation of help is more authentic because posters recognize that many of the “regulars are real users with real experience, not telephone operators reading from a script” (AF1). Users do recognize that the “help files are obviously useful in specific contexts, but there is little documentation in terms of how [the] various functions can be combined in more complex scenarios” (EF4) like networked task contexts. The help documents oversimplify by making too many assumptions about the commonality of the underlying circumstances in which the users need to learn about and apply solutions (see Mehlenbacher, 2013).

The official documentation does not sufficiently appeal to the kinds of users who visit the software forum. The documentation describes scenarios and motivations of use that do not appear to match the complexity or messiness of situated practice and so lack a particular credibility or appeal to ethos. Where in traditional documentation the primary appeal to ethos comes from the writer’s association with the software developer, the credibility of the user forum derives from

their authenticity, the extent to which their answers are grounded in the particularities of the situation presented. The very idea of authority is a social construct; authority is attributional and the product of a social interaction. In the same manner, the authority or ethos of community-generated content arises from the quality of the interaction through which that authority is established (Hauser, 2002, p. 148). What is frequently overlooked about ethos appeals is that they are, at heart, appeals showing that the interlocutor is working with the best interests of the community in mind. And to cultivate that ethos, there needs to be a medium of interaction that is two-way and responsive, unlike text. Moderators have a role to play in this process by helping to underscore the credibility of the information being presented.

The moderators and posters are also aware that the authenticity of their help sometimes comes at the expense of its apparent credibility. Aside from the moderators and the frequent posters, many people on a software forum are unknown and anonymous. And so there is still a need for official documentation (MF PP1), but it is not always helpful from the start. Ideally, helpful answers and good solutions to common problems become a part of the official documentation after the answers have been verified and the steps adequately documented. I have argued elsewhere that answers in a software user forum do go through various stages of stabilization, starting with the thread that gets stickied, when tutorials are created, and when official knowledge base articles are written, and eventually when solutions are embedded in scripts and baked into new releases of the software itself (Swarts, 2015). But if the instructions provided through official documentation are the plans for how work ought to get done, the authentic answers that arise from the forums are the situated applications of those answers that are revised on the fly and in real time. Their authenticity arises from the rigor of the situations in which the solutions are developed and accommodated to users who often “can’t be bothered to put themselves in someone else’s shoes, and will fare much better with an individualised answer rather than a link to a thread that solves a similar issue” (EF3).

Quality Content Is Sometimes Expansive.

Good answers sometimes acknowledged that software packages are complicated and that there may be many right answers for some kinds of questions. As one moderator summed up, “[t]here’s not just one set of instructions that if you want this to happen, you have

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to do ABC. You can do ABC, or you can do ABG, or CDE, or whatever. You may get exactly the same result or you may get something slightly different” (AF1). The answers, literally, expand to other topics and tasks, and preconditions may impinge on the best answer for the question posed. At times, users arrive at the software forum with an idea of how to solve a problem that might be overly complicated or fraught with unforeseen problems. In these situations, posters and moderators hope “the reply will get the poster, and other readers of the thread, thinking about not only the specific problem but other similar problems. Even to the extent of reconsidering their approach to the whole project to make the task more robust or simplified” (AF PP2). We have all probably experienced similar situations of committing to a particular answer or approach in spite of the mounting evidence that it will not work.

Not only are software packages complicated, it is also the case that the tasks people bring to the forums are not neatly confined to a particular piece of software. So a spreadsheet question might involve, principally, the use of a spreadsheet program, but also require interface with accounting software or project management software or might require bringing over data from a different format. When users work on tasks, they often do not use single technologies but instead build around themselves networks of technologies or “functional organs” that are yoked together to accomplish the work (see Kaptelinin, 1996). In these situations, it is unclear where a question would go. It is unlikely that the exact question involving the situated interoperation of a variety of technologies could be addressed within the official documentation from one particular program. Moderators can help draw out some of these situational complexities to make the full nature of the problem as clear and expansive as it needs to be.

Another aspect of expansiveness is that good answers ought not to address only the questions being asked but also to create the right conditions to allow a transfer of knowledge or skills to similar situations. To those posters and moderators attempting to build this knowledge, the best solutions are those that are “so well constructed as to be easily applied to numerous similar situations with only minimal alterations” (EF2). They are solutions that “not only resolve the original problem but also explain the mechanics behind the solution (coherently of course)” (EF4). Both of these approaches not only address questions that are raised but also help to create

knowledgeable users, some of whom might remain members of the community. Consider that a user forum only supplies useful help information so long as content flows through the threads. Content stops flowing if there are not enough people with enough knowledge and experience to put the content in. So, expansive answers ask the users who post questions to indulge the answer providers with a little extra attention and a willingness to read to learn instead of simply read to do (Redish, 1993). By showing how problems and solutions touch on a variety of concepts and related tasks and how they are supported with a variety of reference materials, answers and the engagement that they support in the forum can help create conditions for learning.

Knowledge Managed

User forums tend to attract members with a variety of reasons for contributing to an emergent knowledge base but who often do so out of a desire to be part of a community. For these contributors and those who merely use the forum, there is a benefit to the communal interaction that must be supported. This matter comes to the heart of what technical communicators often do best but do not always recognize in themselves or get recognized for: technical communicators are good communicators. They are good at doing the work of articulation (see Slack, Miller, & Doak, 1993) of linking people and resources together, of making communities and collaborations possible. This articulation work is important in a user community and to the task of documenting shifted tasks.

Quality Interactions Are Speedy, Persistent and Customized. A welcoming community is a quality that moderators and frequent posters strive to maintain. And one of the first tasks is to ensure a continual stream of interactions that welcome newcomers and returning visitors to the site (see Frith, 2014, p. 180). There are few things that cause a thread and community to wither faster than the lack of response.

Without feedback from the community, there is no community. “This is one of the problem points of community forums: lack of feedback and the option to just abandon your post. It results in threads that just don’t continue, as well as threads that provide perfect solutions, which may never be probably acknowledged” (EF3).

Posters likened the dynamics to “walking into the hardware and just saying, “Well, all you guys here look like you know what you’re doing. How would you do

this project?” (AF1). It is a friendly gathering of skilled people who are interested enough in a topic to help people with their questions. In fact, many people, when asked to describe the most helpful responses, said that it was any response to the question at all. The beginning of the engagement process, even if to ask for clarification of the problem, even if just to acknowledge that a post has been seen, is understood to have a significant positive effect on the outcome a thread, if only because the basic engagement keeps the thread alive.

The motivation is to keep information flowing through the community. If there are speedy responses, even short acknowledgments, then visitors stay engaged in the thread and are more likely to come back. The speedy reply also addresses user concerns about whether the forum is busy enough to get answers within a reasonable time frame. But mere activity is not enough to make the community valuable. The advantage of two-way communication is that it allows for the exploration of problems to get at customized answers and, by in large, moderators are willing to engage individuals at the level they are at: “time permitting, stay with a thread when the replies from the OP (original poster), esp newbies, displays evidence of not understanding or misunderstanding the information being offered” (AF PP2). Those people who feel like they have benefited from the intelligence and persistence of the community are more likely to continue contributing.

This attitude results in community members demonstrating remarkable patience, allowing posters to start threads on what seem to be the same questions, repeatedly. Sometimes the questions are the same, but just as often “you get questions about situations that are similar but not the same. As something that might have been asked before a new way to do something, or an odd ball requirement. And then you have to talk about the ramifications of using this technique or that technique and let people decide whether one way is better than the other” (AF 1).

Quality Interactions (Re)Assemble the Community. In addition to tending to the needs of newcomers, community members must also tend to the needs of the community and make the effort to build out the community and to strengthen its connections by involving community members with different skills sets (for example, coding, scripting, design), keeping posters engaged in threads, and helping newcomers become helpful and engaged contributors themselves.

When asked why they participate in the forums, what brings them back when they are receiving no financial benefit, many moderators and posters pointed to the camaraderie between them and the forum regulars, the ability to come and talk with the regulars about “arcane topics” that might not come up as questions. Just as many have altruistic reasons for sticking with the forum: “[m]ainly to give back some of what I’ve learned” (AF 1) and to “pay it forward” (GF PP1). In the eyes of their peers, the best community members are “[p]olite, supportive, [and] knowledgeable, with willingness to delve deeper if the discussion heads in that direction” (AF PP3). These members make up communities that do not want to make any member or newcomer feel unwelcome.

It is also important to get the community to come together and act as a community. In this sense, we are talking about community as an effect, a dynamic, a spontaneous, coordinated interaction that is often invoked by posters or moderators. A frequent poster from the GIMP forum describes it this way: “[t]he best contributions usually come from the most experienced coders or users of GIMP. Today would be a perfect example to answer this question. [Moderator] asks about a gradient effect, she has used one of my tutorials to accomplish it in part, but asks if there is a better way. In comes [Community Member] (a very skilled coder and contributor) who offers a very unique description along with screenshots” (GF PP2). Around the moderator, the other respected members of the community converge and in this convergence begin to offer something that is beyond what the original poster had sought: it is a kind of wisdom and depth of response that is possible because of how knowledge is distributed across the members of the forum but then coordinated in the forum. The larger community “shares resources and ideas” (GF PP3) because they have different ones to share.

Of course people come to the user forums to have their questions answered, but the forum must also renew itself by being a place where knowledge is explored and developed. There is the expectation that users will be engaging in this content to become more learned themselves and to become contributing members of the community: “I chose a forum to answer in based on it’s *[sic]* online atmosphere. The people asking questions should be those who are after help to resolve their problem but at the same time want to increase their own understanding of the problem and solution” (AF PP2). In fact, the moderators and posters often see themselves as educators.

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Maintaining quality content and quality interactions are both outcomes of a process of communication. And this is where technical communicators excel and can assert their value. Identifying the roles that technical communicators can play in that setting is a matter of identifying how communication skills can be put to use, not generating content but in orchestrating the development of raw content and organizing the logistics of a response and follow up to those conversations. In concluding, by talking about the roles the technical communicators can play in this dynamic theater of documentation, we can again turn to the moderators to see how they understand their own roles.

Discussion: A Place for Technical Communicators

I conclude by discussing how the practices discussed in the interviews overlap with commonly technical communicator skill sets. The purpose is to show where we might apply our expertise if our attention is not solely focused on generating raw help content.

Correct, Clarify, and Contextualize

One of the most important roles that technical communicators can play in managing community forums is, perhaps, the most intuitive one: guide the discussion (see Frith, 2014, p. 178). Moderators nudge both questions and responses so that they are clearer and so that the answers that follow are more accurate. They correct mistakes if discovered. They expand content to related issues or consolidate for better precision. Most often, the role played by moderators is simply to keep the threads on topic. This is a function that shows up repeatedly in the moderator comments and reflects a realization that threads can quickly diverge, adding sprawl to the thread and preventing forward movement toward a clear answer. Length of discussion is not a problem so much as a lack of focus. One way in which this problem manifests itself is when other users follow the original poster and use the same thread to ask their own question, which may appear to be the same but could be quite different given the range of circumstances in which their own problems arose. Moderators then see it as their function to “discourage lots of other people from chiming in. We’ll let them chime in if they have a very similar problem, and it doesn’t prove a distraction to the original poster. But it’s got a very specific focus” (AF2).

Moderators can also recognize when problem statements seem unusual, lack detail, or whether answers are wrong or incomplete. In situations like these, moderators can push the thread in the right direction by correcting the course of the discussion as soon as an error is detected. “A frequent problem in providing support on the forums is that the initial post from the OP provides little useful information, e.g. ‘My browser doesn’t work anymore.’ The subsequent exchange seeks to elicit details that might be helpful in diagnosing the user’s problem” (MF 1). Technical communicators are similarly tuned to the same details and problems in their own writing. Within a user forum, the skill is turned outward to the people who are generating the content. Technical communicators understand the genred forms of help topics, the kinds of information that prove useful to both understanding a problem and carrying out a solution. It is a simple matter of participating in the discussion to draw this information out and let the community work with a full understanding of the problem and the user work with a fuller explanation of the solution.

Technical communicators, like moderators, can step in and help start an answer off on the right foot by appreciating the difficult nature of the problems being addressed. First, they can recognize that one cannot make assumptions about the poster’s starting point (for example, the state of their software or operating system); neither can one know about the full parameters of the problem. If the poster is unaware of what factors have a role in creating the problem, neither can it be entirely clear what the ideal solution will be. A long enough conversation, however, will likely touch on these points, and a moderator who knows the general shape of these discussions can probe for more information about the work environment in which the problem occurs and the poster’s expectations for a solution. Effective moderation can prompt the community members to provide this kind of information and in doing so focus the conversation.

Maintain the Community

As I have implied throughout, another important factor is politeness. Moderators will sometimes need to maintain civility and find a place for everyone in the community. In part, moderators do this work because their role is “to facilitate discussion, which includes correcting errors posted by other contributors to the topic and getting the topic on track if it goes off on a tangent” (MF PP1). Fulfilling this role sometimes means

that the moderator is the first to respond in a thread, to break the ice on an issue that might be so obscure that regulars in the community cannot find a way into the question (AF1). But above all, the goal is to “[m]aintain the sense of community. Online forums live or die by the quality of their participants and the atmosphere they project. If we can keep the users happy and encourage them, the forum will thrive and everyone benefits” (EF2). Not to diminish the professional responsibilities of technical communicators, but this is also something at which we excel. Numerous studies (Rainey, et al., 2005; Whiteside, 2003) point out that technical communicators are skilled at facilitating interpersonal interactions around and about technical content. And since continued discussion is the medium out of which solutions to complex problems emerge and the credibility of answers and posters are established, forums depend on the guidance of people who are skilled at putting people into conversation and keeping them there and focused.

Create Infrastructure

The last function is understated but is critical to identifying what is important and worth knowing in a thread and in a user community: the ability to recognize and create information out of the experiential and social data that community members bring and the computational data that comes from their interactions with software. Moderators help create information by giving it form, by understanding how different members of the community need to see problems to respond to them and need to see solutions to enact them (also in Frith, 2014, p. 179). Moderators clean and merge and organize and label threads to make them usable (EF2 and EF3). In other words, they make dynamic content findable by giving it structure (see Hackos, 2002; Morville, 2005). They also facilitate the transformation of stabilized community knowledge into permanent documentation artifacts. In this way, moderators make sure that the forum is helpful as a resource while also serving as a conduit for issues back into the official documentation and even back into the product itself. Organizational communication is another strength that technical communicators can bring. They are accustomed to talking with developers and users and can effectively liaise between those groups. They can bring the developers into contact with the users and serve as a point of access.

Even within the forum, however, exercising some sensibility about information design is enough to

make the content on the forum useful to both current conversants but also to future visitors. Clarifying title threads is one quick way to make improvements: “we are quite adamant about people having appropriate thread titles that briefly describe the problem” (EF1). Technical communicators can also help with the tagging of specialized content (for example, code snippets) so that it is easily found and recognized (EF3). All are elements of information architecture. Another cognitive and affective design aspect concerns how well a thread can communicate the payoff for reading it. Threads marked “closed” or “resolved” help communicate that an issue has been addressed and so potentially builds the confidence of the community members browsing search results.

Returning to a point from earlier in this paper, we can sum up by pointing out that technical communicators do have a role in the creation of knowledge on a community forum, but in recognizing that the users seek contingent and situated knowledge, the technical communicators will contribute by making possibility knowledge or the conditions in which such knowledge can be created through an exploration of task shifted situations. This is not to say that technical communicators have no role in creating the more representational, stabilization knowledge but that the very reason some people come to the software user forums is that there is no stabilized form of knowledge that will, as yet, suffice for the messiness and contingency of their shifted tasks.

The technical communicator best serves this community by facilitating the conditions for creating possibility knowledge while looking for opportunities to turn whatever content is generated into stabilization knowledge (as print documentation, embedded help, knowledge bases, software updates). Moreover, the technical communicator will also exercise her assets by maintaining the conditions necessary to explore the possibility of knowledge, for meeting contingencies and playing out their effects on help topics. Technical communicators need not be responsible for generating all of the help content or for foreseeing all of the help topics. The user base is doing this traditional technical communication work already, and our roles may be to help diffuse into these user communities not technical communication artifacts but rather a sensibility or a process of doing technical communication work. We do not diminish our professional contributions in shifting to those role but instead refocus them on skill sets for which our expertise has been under appreciated.

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References

- Bawarshi, A. S., & Reiff, M. J. (2010). *Genre: An introduction to history, theory, research, and pedagogy*. West Lafayette, IN: Parlor Press. Retrieved from http://wac.colostate.edu/books/bawarshi_reiff/
- Engeström, Y. (2007). From stabilization knowledge to possibility knowledge in organizational learning. *Management Learning*, 38(3), 271–275.
- Engeström, Y., Engeström, R., & Kärkkäinen, M. (1995). Polycontextuality and boundary crossing in expert cognition: Learning and problem solving in complex work activities. *Learning and Instruction*, 5, 319–336.
- Frith, J. (2014). Forum moderation as technical communication: The social Web and employment opportunities for technical communicators. *Technical Communication*, 61(3), 173–184.
- Hart-Davidson, W. (2013). What are the work patterns of technical communication? In J. Johnson-Eilola & S. Selber (Eds.), *Solving problems in technical communication* (pp. 50–74). Chicago, IL: University of Chicago Press.
- Hauser, G. A. (2002). *Introduction to rhetorical theory*. Long Grove, IL: Waveland Press.
- Hutchins, E. (1995). *Cognition in the wild*. Cambridge, MA: MIT Press.
- Kaptelinin, V. (1996). Computer-mediated activity: Functional organs in social and developmental contexts. In B. A. Nardi (Ed.), *Context and consciousness: Activity theory and human-computer interaction* (pp. 45–68). Cambridge, MA: MIT Press.
- Mehlenbacher, B. (2013). What is the future of technical communication? In J. Johnson-Eilola & S. Selber (Eds.), *Solving problems in technical communication* (pp. 187–208). Chicago, IL: University of Chicago Press.
- Miller, C. R. (1984). Genre as social action. *Quarterly Journal of Speech*, 70(2), 151–167.
- Norman, D. A. (1999). *The invisible computer: Why good products fail, the personal computer is so complex, and information appliances are the solution*. Cambridge, MA: MIT Press.
- Rainey, K. T., Turner, R. K., & Dayton, D. (2005). Do curricula in technical communication jibe with managerial expectations? A report about core competencies. In *Proceedings IPCC Professional Communication Conference 2005* (pp. 359–368). Piscataway, NJ: IEEE.
- Redish, J. C. (1993). Understanding readers. In C. M. Barnum & S. Carliner (Eds.), *Techniques for technical communicators* (pp. 15–41). New York, NY: Macmillan.
- Saldana, J. (2009). *The coding manual for qualitative researchers*. Thousand Oaks, CA: Sage.
- Selber, S. A. (2010). A rhetoric of electronic instruction sets. *Technical Communication Quarterly*, 19(2), 95–117.
- Shirky, C. (2011). *Cognitive surplus: How technology makes consumers into collaborators*. (Reprint ed.). New York, NY: Penguin.
- Slack, J. D., Miller, D. J., & Doak, J. (1993). The technical communicator as author. Meaning, power, authority. *Journal of Business and Technical Communication*, 7(1), 12–36.
- Spinuzzi, C. (2007). Guest editor's introduction: Technical communication in the age of distributed work. *Technical Communication Quarterly*, 16(3), 265–277.
- Sunstein, C. R. (2006). *Infotopia: How many minds produce knowledge*. New York, NY: Oxford University Press.
- Swarts, J. (2015). Help is in the helping: An evaluation of help documentation in a networked age. *Technical Communication Quarterly*. doi: 10.1080/10572252.2015.1001298
- Van Der Meij, H., Karreman, J., & Steehouder, M. (2009). Three decades of research and professional practice on printed software tutorials for novices. *Technical Communication*, 56(3), 265–292.
- Whiteside, A. L. (2003). The skills that technical communicators need: An investigation of technical communication graduates, managers, and curricula. *Journal of Technical Writing and Communication*, 33(4), 303–318.

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Manuscript received 31 December 2014; revised 16 February 2015; accepted 16 February 2015.

A Constructionist English Language Teaching Project Based on an Aeronautical Conceptual Design Challenge

Dietmar Tatzl

Abstract

Purpose: This article presents and evaluates an educational project designed to simulate a professional workplace environment for tertiary aeronautical engineering students. Students had the options of working with engineering-related software or choosing a theoretical topic for an undergraduate English language project.

Method: This practitioner case-study research is based on a mixed-methods approach. Students were asked to complete a quantitative evaluation survey, which was complemented by an analysis of students' project reports, presentations and the teacher's supervision log. The final reports functioned as both an assignment for marking and an evaluation of the project results.

Results: In total, 14 out of 20 students returned an evaluation survey sheet. Based on the mean group rankings of statements on a five-point Likert scale (0 to 4 points), the results showed that students perceived several objectives as *greatly* achieved: expanding subject-specific vocabulary (3.35), working with scientific literature (3.21), following a given template for writing scientific texts (3.21), and practicing techniques of literature search (3.07). Furthermore, students found it *very important* that they could exercise *autonomy during the project phase* (3.78) and had been allowed *free choice of the project topic* (3.64). The five project groups submitted reports of generally good linguistic quality on different aeronautical subject areas.

Conclusion: As it may be concluded from the questionnaire responses, students favored language learning through collaborative constructionist project activity and learner autonomy. A didactic framework that promotes these elements seems to be well suited for similar technical learning environments, although no direct generalizations can be made from this small-scale case study.

Keywords: constructionism, learner autonomy, design project, engineering software, English language

Practitioner's Takeaway

- Constructionism and autonomy evolved as perceived facilitating factors of learning in this case-study research.
- English language and technical communication classrooms may profit from the adoption of constructionist and learner autonomy principles.
- Technical communication skills can be improved through collaborative project work.
- Collaborative project work is a flexible and versatile educational concept.
- Collaborative project work is thematically adaptable to various tertiary contexts.
- The concept of *controlled choice*, the selection of a concrete task option embedded in teacher-controlled instructions, was important for students.

A Constructionist Teaching Project

Introduction

Teaching English for specific academic purposes (ESAP) requires flexibility, creativity and variety of course design, activities, tasks and assignments on the part of language professionals. It is facilitated by a teacher's affinity for the respective content area and further demands continual and intensive efforts to gain a certain familiarity with specialist subject matter. Such engagement is a prerequisite for the development and delivery of custom-made instruction that is likely to cater for students' interests and needs.

The current article attempts to describe and evaluate an educational concept specifically designed to improve technical communication skills of tertiary aeronautical engineering students. Miller and Selzer (1985) have pointed to the fact that "discourse in particular communities is shaped by the generic, institutional, and disciplinary conventions of that community" (p. 338). Among such conventions of aeronautical engineering is the project- and design-driven environment of a competitive industry. It is the goal of this article to propose a way of integrating this environment's conventions into tertiary English as a foreign language learning for undergraduate students.

Constructionist Ideas

The educational concept presented here rests on constructionist theory. Constructionism embraces a "view of learning as a constructive process" (Bednar, Cunningham, Duffy, & Perry, 1992/2009, p. 22), in which "content cannot be prespecified" (p. 23). In other terms, constructionism relies on the creation of new content through learning, so that learning becomes an open-ended process with unpredictable outcomes. It is, therefore, a pedagogic stream that allows for the employment of knowledge generation, design tasks and authentic artefacts in the service of foreign language learning.

As Kafai and Resnick (2008) have noted, constructionism is "both a theory of learning and a strategy for education" founded on constructivism (p. 1). In the tradition of Piaget, a pioneering proponent of constructivism, Papert (1993) has advocated "the natural, spontaneous learning of people in interaction with their environment" (p. 156). In contrast to a positivistic interpretation of science, Papert (1993) has expressed an interest in "knowledge that is more qualitative, less completely specified, and seldom

stated in propositional form" (p. 138). Such an approach favors the explorative nature of scientific reasoning. Nevertheless, it should be remembered that the positivistic scientific method with its focus on measurement precision and mathematical evidence lays the foundations for engineering disciplines and professions, whose students constitute the target learners for the concept described in this article. In other words, constructivism and positivism should not be regarded as mutually exclusive but complementary approaches to educational, professional and scientific practice.

Another key idea of constructivism has been explained by Jonassen (1992/2009), who has noted that "learners can only interpret information in the context of their own experiences, and what they interpret will, to some extent, be individualistic," so that they "construct their own meaning relative to their needs, backgrounds, and interests" (p. 139). This focus on learning from and through experience emphasizes the necessity of involving students in the educational process and activating their language use in a context they can identify with. An implementation of learning through experience in technical communication courses has been described by Ross and Arnett (2013), who endorse the benefits of a hands-on classroom.

Similarly, advocating a sociocognitive approach to second language learning, Atkinson (2011) has argued that cognition, "the guiding concept and preeminent location of second language learning for the first four decades of its systematic study," should be reconsidered and understood as "a process projecting well beyond the boundary of the skull, and rather directly into the everyday worlds of social activity and practice" (p. 162). This recommendation is a further expression of the key constructionist thought of collaborative and interactive learning. In summary, the main ideas found in constructionism that have influenced the project concept in this article are learning through explorative creation, experience, collaboration and interaction as well as a careful consideration of students' learning environment.

Engineering Workplace Characteristics

Apart from the immediate study context, students' future professional environment plays a role for designing educational tasks and activities. There are both similarities as well as fundamental differences between the academic world of teaching and research on the one hand and engineering career fields on the other.

Engineering science and science are founded on the same natural laws; they use the same modes of dissemination, and the knowledge they generate is cumulative (Vincenti, 1990, p. 134). Thus, a strong link between academia and technical professions is formed by scientific reasoning, which, however, tends to produce different outcomes. The purpose of scientific activity is an increased understanding of nature, whereas that of engineering science is the creation of artefacts (Vincenti, 1990, p. 135). Furthermore, scientific reasoning is closely related to scientific publication, as only through publication does research become widely available and thus usable within specific communities. Applied engineering disciplines, however, differ in an important aspect from fundamental science, as Winsor (1998) has argued: “For the engineer, the equivalent of scientific publication is probably the release of the object to the marketplace” (p. 344). This thought underscores the focus of engineering disciplines on the design, construction and manufacture of concrete material products. Industrial engineers, then, as Winsor (1998) has suggested, are faced with a working environment different from that of scientific publication at universities: “The knowledge they create must be jointly held by those within their own organizations and largely withheld from those outside – a state of affairs that is obviously intertwined with the discipline’s lack of emphasis on published articles” (p. 345). Engineering, thus, epitomizes a key thought of constructionism, and that is the collaborative creation of knowledge, albeit with a clear tendency toward securing confidentiality and profitability of inventions and developments. In other words, securing intellectual property rights in engineering mainly functions by means of patent applications, non-disclosure agreements and partner contracts.

Engineering reasoning has been viewed as shaped by the demands of the workplace and “referred to as *design thinking* [emphasis in original]: a high level of creativity and mental discipline as the engineer tries to discover the heart of the problem and explore beyond the solutions at easy reach” (Sheppard, Macatangay, Colby, & Sullivan, 2009, p. 100). Meyer (1985) has attributed such problem-solving skills to the “cognitive structure in the engineer’s mind,” which rests on “facts and rules” (p. 25). Providing learning scenarios in which engineering students are enabled to apply creativity and collaboration has been accepted as an important factor in raising student motivation (Benjamin & Keenan, 2006, p. 7).

Another characteristic of engineering workplaces is the multimodality of their machines, hardware, software, interactions, routines, and communication media. Even though Johns and Swales (1998) have noted that “literacies of all types (visual, textual, computational) and in all locales (occupational, professional, academic) are multimodal and multi-dimensional” (p. 25), this is particularly true of engineering disciplines, as Kleifgen (2013) has demonstrated with ethnographic fieldwork at a medium-sized high-tech firm in Silicon Valley. Also Winsor (1990) has pointed to engineers’ “observations of writing such as instrument traces, data sheets, and log books” (p. 68).

Furthermore, Winsor (1998) has addressed the importance of written documents and drawings in engineers’ work (p. 352). The production and management of these documents and drawings mainly involve computers and specialist programs, which are multimodal yet also characterized by a high proportion of graphical information. In many cases, the graphical output of data serves multiple purposes, such as analysis, evaluation, process monitoring or product adaptation, to name but a few.

The engineering workplace is further characterized by the complexity of engineering tasks. This becomes evident when one considers the magnitude of certain engineering products, such as buildings, cars, ships or aircraft. However, the Cognition and Technology Group (1992/2009) has argued that “the degree to which complexity is or is not problematic depends on the teacher’s approach, since this will impact the learner’s approach” (p. 117). In other terms, the teacher needs to cater for degrees of complexity in task design and allow room for students’ creativity and personalized learning.

Finally, work in an engineering organization is highly collaborative (Winsor, 1989, p. 271). This circumstance is indeed necessitated by the complexity of engineering tasks, which requires concentrated group efforts and whose solution lies far beyond any individual’s capabilities. Even though individual knowledge and skills are highly valued in industry, it is only possible through the collaboration of specialist experts that new products are engineered.

The Question of Authenticity in Tertiary Engineering Education

Writing is a skill integral to engineering activity, as engineering knowledge is documented and constructed through written symbol systems so that writing and

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technical work are interwoven and mutually dependent (Winsor, 1990, p. 59, 1994, p. 230). In the context of specialist writing programs, Paradis, Dobrin, and Miller (1985) have raised the question of how effectively universities can contribute to professional writing education, “since writing responsibilities and audiences appear to vary greatly from industry to industry and from job to job” (pp. 303–304; cf. Henschel & Meloncon, 2014, p. 21). Similarly, Couture, Rymer, Goldstein, Malone, Nelson, and Quiroz (1985) pointed to diverging perspectives of university writing teachers and industry advisory board members on the role of the classroom, with some industry professionals implying that classroom activities should not only stimulate but “replicate workplace tasks” (p. 420) so that the classroom would become “a mini-workplace” (p. 421). On the other hand, from the perspective of aircraft design education, Young (2000) has considered it “foolish to assume that universities can and should provide all the building blocks of knowledge, social and technical skills, experience and judgment – essential to the making of a professional engineer,” but they must “lay the foundation for this process and prepare the individual for life-long learning” (p. 211). The question to what extent the professional workplace should and can be replicated in the university classroom, thus, remains open to debate. Yu (2010) has addressed concerns about imitating commercial training when aligning university education with industry norms (p. 43), and Quick (2012) has suggested that capitalizing on adult students’ workplace experience in the classroom may require direct and explicit guidance from teachers (p. 248). The workplace and the university are two very distinct environments with rather diverging goals. While the university attempts to educate new generations of scientists and professionals according to disciplinary conventions and standards, industry recruits graduates and professionals ultimately for competing in business and on the global market to increase its profits.

Lave and Wenger’s (1991) concept of situated learning very much depends on the integration of aspirants into target cultures: “To become a full member of a community of practice requires access to a wide range of ongoing activity, old-timers, and other members of the community; and to information, resources, and opportunities for participation” (pp. 100–101). Needless to say, such access to workplace communities remains difficult to achieve for students

and instructors involved in tertiary education. Indeed, the tertiary learning environment forms a distinct community of practice in its own right. It follows that English language teaching in higher education, as any teaching in university and college contexts, is bound to reach limited degrees of professional authenticity only, yet this circumstance does neither diminish the quality of tertiary learning, nor does it devalue it. Quite on the contrary, communities of tertiary ESP and EAP practice constitute essential components of students’ learning experience and education for industries and professions. At this point, it is helpful to remember Widdowson’s (1983) distinction of authenticity referring to text, purpose and task. In other words, full authenticity seems to be achievable only in the workplace, but authenticity of text, purpose and task is possible to various degrees and relative weightings also in educational settings.

Ways of Simulating Engineering Workplace Reality in Classroom Teaching

In the context of engineering education, Sheppard, Macatangay, Colby, and Sullivan (2009) have suggested case-based instruction as an alternative way of teaching design, “using design cases in which particular aspects of the design process are highlighted” (p. 127). Case-based instruction has also been employed for the integration of engineering practice into foreign language classrooms (Tatzl, 2014). Career-field cases from students’ areas of interest promise to raise motivation and engagement for foreign language learning.

There are further ways of furnishing the university classroom with workplace-related tasks and resources. Perkins (1992/2009), for instance, lists five facets of a learning environment such as a classroom: information banks, symbol pads, construction kits, phenomenaria and task managers (pp. 46–48). These classroom components can be rather easily designed in ways to bring the classroom closer to the workplace, for instance by providing authentic source materials.

Another favorable option is project-based learning (PjBL), which has proven to be an effective approach to the integration of language and content learning in engineering disciplines (Casey, 2012; Chalifoux & Vinet, 1988; Tatzl, Hassler, Messnarz, & Flühr, 2012). From a content perspective, “[d]esign projects offer opportunities to approximate professional practice, with its concerns for social implications; integrate and synthesize knowledge; and develop skills of persistence, creativity,

and teamwork” (Sheppard, Macatangay, Colby, & Sullivan, 2009, p. xxii; see also Fielding & Jones, 2000). Design projects, thus, cover training in the skills areas that engineers need to possess according to Phil Condit, former chief executive officer of Boeing: collaboration, communication, cost awareness and continuous learning (Gorman et al., 2001, p. 144; see also Meyer, 1985, p. 25). In the 21st century, international project work has been facilitated by the use of online collaborative writing tools (OCWTs), as Behles (2013) has suggested in a study of technical communication practitioners and students. From a linguistic perspective, projects represent an authentic scenario where students need to communicate on planning, organization, methods, problem solving, and content, progress monitoring and reporting. These and many other communicative events and situations offer learners a field for experimentation with different language forms and functions so that language becomes an integrated and essential factor for completing a concrete task. Furthermore, Wong and Nunan (2011) have noted that effective learners endorse an instrumental view of “language as a tool for communicating” (p. 155), which they find epitomized in project-based learning. Besides communication skills, Musa, Mufti, Latiff, and Amin (2011) have mentioned students’ exposure to team work, conflict management and decision making in PjBL (p. 194).

There are also drawbacks of educational projects, though. Larson, Birge, Huang, Sattler, Turns, and Yellin (2009), for instance, observed tensions for educators, who had meant to ensure the exploration of certain topics and underlying concepts but encountered the frictions of learning versus producing in a non-traditional pedagogic setting (p. 174). Another limitation of educational projects is that they remain educational and merely simulate the solution of an engineering task, yet this limitation should not be overestimated, as Sheppard, Macatangay, Colby, and Sullivan (2009) have argued: “In experiencing a simplified approximation to engineering practice, the novice nonetheless gets a sense of the breadth of engineering’s dimensions” (p. 17). In linguistic terms, this limitation is almost negligible because the language needed for talking about and describing the project will be very close to expressions and terminology found in the actual content area. The longer the project lasts, the greater the authenticity of the language used will become, as students dig deeper into the subject matter.

A Technical Communication Course for Aeronautical Engineering Students

Technical communication education is characterized by a great variety of programs, concentrations, tracks, specializations and courses, as Meloncon and Henschel (2013) have demonstrated for United States undergraduate degree programs. This variety increases when international programs are taken into consideration. Technical communication courses in English-speaking countries tend to be designed for native speakers of English, yet in other regions of the world, technical communication components are more likely to be integrated into tertiary English as a foreign language streams and courses. In such contexts, technical communication means using a foreign language for oral and written communication in the workplace, for a wide range of purposes, genres and situations.

The current course is embedded in an Austrian undergraduate aeronautical engineering curriculum and located in the second year (fourth semester). It is a technical communication course aimed at enhancing students’ English as a foreign language skills and specialist vocabulary knowledge in aeronautical technology. It runs over a full semester with two contact teaching hours per week, amounting to a total of 30 hours teaching time. Its main components are writing a technical report, abstract writing, presenting results, process descriptions, and a range of specialist topics for communication practice. Course assessment is composed of a final examination (40%), a technical project report (40%), a group presentation (10%), and participation (10%). The presentation is thematically linked with the final project report so that these two elements comprise 50% of the total course grade.

A teaching problem encountered by the course instructor was the right task selection for an adequate preparation of students for employability in engineering workplaces. In the technical communication literature, practitioner-student interaction has been proposed as a means of bridging the gap between academia and the world of work (Jennings, 2012). Such a constellation, however, is only feasible in settings where the practitioner in the workplace is an educated technical communicator and the student is committed to seek employment as a technical communicator after graduation. In addition, mentoring relationships in technical communication are difficult to establish owing to the lack of a mentoring culture and models, which are more firmly anchored in disciplines such as science,

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engineering, and business (Zimmerman & Paul, 2007, p. 198). In the course environment under consideration, practitioner-student interaction is not viable, as practicing engineers are subject-matter experts in aeronautics occupied with core engineering performance and not technical communication professionals trained to promote students' English language skills. This is not to say that engineers do not need to communicate technical contents on a regular basis, quite on the contrary, but they are no linguists or writing instructors.

In view of international employability, the main goal of this course is equipping learners with improved foreign language skills that allow them to function as professionals in a global industry where English serves as the common communication link among different cultures, companies and countries. The instructor, therefore, needed to find a way to create a learning environment that catered for both students' and workplace needs, fitted into the curricular framework of the degree program, and satisfied the dual goal of content and language learning.

Inspired by salient characteristics of the engineering workplace, thus, the course instructor aimed at a capitalization on multimodality, computer-aided drawings, task complexity, collaboration, and the career field's problem-solving disposition in designing an educational scenario for undergraduate students. He found that these requirements for replicating authentic engineering activity in the technical communication classroom were well met by constructionist project-based learning.

Rationale Behind the Constructionist English Language Teaching Project

The English language teaching project described in this article was founded on constructionist theory and learner autonomy (Holec, 1981, p. 3; Little, 1991, p. 4). For this reason, the task aimed at providing students with the opportunity to work with engineering-related drawing software but also to choose the project topic freely. Software has been used successfully in technical communication courses in the past (Brumberger, Lauer, & Northcut, 2013, p. 189). In the current project framework, groups of four students could select a topic they were most interested in and felt comfortable with. Bloor and St John (1988) have held group projects "only suitable for homogeneous groups where all students are working in similar fields" (p. 86), which applies to the case described here.

The first option required students to design the concept for a silent aircraft with the software package

Rhinoceros® (2011), which learners had already used in a content course. As professional engineers are occupied with "the design, analysis and improvement of complex systems" (Denton, 1998, p. 19), this requirement has formed an attempt at simulating workplace reality in the language classroom. Learning by designing (Enkenberg, 2001, p. 500) or learning through design (Kafai & Resnick, 2008, p. 4) also constitutes a fundamental teaching model in engineering education. The student designs were supposed to form the basis for their final project reports and had to be supported by professionally published literature.

Alternatively, students could select a research problem or topic from one of their current subject-specific courses. They were thus free to choose a project assignment in one of their aeronautical, engineering, science or business lectures, or they could improve and extend their knowledge about a certain subject treated in one of the courses on the curriculum. In both cases, they were required to incorporate academic research into their own writing.

This element of choice represents a feature of learner autonomy, which aims at educating independent learners responsible for their own learning strategies, means and outcomes (cf. Enkenberg, 2001, p. 500; Esch, 1996, pp. 39–40; Legenhausen, 1999, p. 67). In Little's (1995) words, an important aspect of learner autonomy is "the development of a capacity to reflect on the content and process of learning with a view to bringing them as far as possible under conscious control" (p. 175). In the current case, students were granted considerable control over the content and learning process concerning the completion of the project assignment.

The project's global goals for language learning were the improvement of technical communication skills, writing skills and research strategies. Its language learning objectives were searching for and working with literature on a scientific topic; recognizing and implementing features and conventions of technical-scientific writing; adopting appropriate language, register, and style for technical-scientific writing; expanding subject-specific vocabulary in context; following a given template for writing technical-scientific texts; reporting results according to a given structure; and peer-reviewing and editing technical texts.

Content goals and objectives had not been stated explicitly but were assumed to be understood by students as a result of the project task. The implicit content goal was an expansion of aeronautical

knowledge, and implicit objectives were gaining a better understanding of self-selected academic areas, practicing the use of engineering software, and treating aviation-related subject matter in a project.

Description of the Constructionist English Language Teaching Project

The technical communication in English project resulting from the constructionist and learner autonomy rationale described above lasted for three months and ended with the submission of the final reports and the oral presentations of each group. The course instructor introduced the assignment in class and, together with the whole year group, defined basic specifications and evaluation criteria for a conceptual design challenge aircraft. Some design specifications for this silent commercial airliner were a capacity of 200 to 300 passengers, two engines, medium range and noise levels below those of current aircraft of comparable size. Over the full project duration, the course instructor conducted writing support activities in class to accompany the project with linguistic input at regular intervals. These support activities encompassed syntax checks of technical texts, the production of syntheses of academic sources, quotation and referencing, abstract writing, and the usage of scientific research journals.

Students were encouraged to work on their project topics continuously and to transfer the knowledge about technical-scientific writing gained in class to the independent production of their final reports. The resources for completing their projects were available from the university library, the institute's electronic data processing infrastructure, and online information databases. Thus, students operated in a technology-assisted learning environment with computer labs, software packages and wireless Internet access. In other words, the project employed hardware and software components that facilitated the implementation of the constructionist rationale for producing a conceptual aircraft design.

At the end of this three-month project, students handed in a final report to document the results of their research activities. For preparing their written group reports, learners had been instructed to present concrete outcomes in the form of verbal descriptions, tables, and charts. Students had been further advised to consult the institute's template for scientific writing. This assignment may be classified as a product approach

to writing, which corresponds to scenarios encountered in aeronautical disciplines and career fields when professionals report the results of their technical, scientific or economic project activities.

The project finished with the oral group presentations of the final reports in class. Students were asked to use Microsoft® PowerPoint® slides and were assigned a time limit of 15 minutes. Every project member had to participate in the preparation and delivery of the talks. The pedagogic objectives of these presentations were to train students in subject-specific speaking, listening, and interaction skills as well as to create a forum for sharing their achievements with others. Furthermore, the presentations necessitated learners processing in an oral mode the written reports they had completed, which was supposed to extend and reinforce learning gains. In this way, students were encouraged to translate content they had treated over an extended period and documented in a report into a presentation format. This entailed the cognitive processes of evaluating, selecting, and condensing information to clearly communicate their project outcomes.

Methods

The methods adopted to evaluate this constructionist English language teaching project were both quantitative and qualitative in nature. The quantitative part consisted of a project task evaluation survey that students completed after the final class. The qualitative part included an analysis of students' final project reports, students' final project presentations, and the teacher's project supervision log. The final reports served as an assignment for marking on the one hand and as an evaluation of the project results on the other. This written student-produced documentation was complemented by oral presentations of each project to gain insights into further aspects that might have been missed when considering the written mode only. Finally, these student-produced data were balanced by the teacher's observations noted down in the project supervision log.

Project Task Evaluation Survey

The project task evaluation survey was designed in paper form and distributed to students by email. Students were invited to complete the survey and drop it into the teacher's in-tray in the institute's office. The sheet consisted of a total of 16 statements in two categories and a free

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verbal feedback section. The two categories were *Project objectives* and *Project components*, and each of these two categories required students to rate eight related statements on a 5-point Likert scale respectively (from 0 or *Not at all* to 4 or *Fully*). These categories were introduced with the instruction to indicate the extent to which students thought they had reached the project objectives set and to answer the question how important the project components listed were for them. In this way, it was deemed possible to receive readily comparable statements that could be ranked after an analysis of students' responses.

Students' Final Project Reports

Students' final reports assumed the function of qualitative data sources for evaluating this educational project. All reports were corrected, marked, and classified according to the two assignment options, design project or literature review. In addition, verbal evaluation summaries were produced for each group report.

Students' Final Project Presentations

For the purpose of this classroom research, the oral group talks and presentation slides were analyzed concerning the criteria of content, organization, and language. These areas were chosen because they represent key skills important in higher education and professional lives. The content criterion was supposed to illustrate learners' ability to select the appropriate amount and type of information from their projects, and the organization criterion should reveal whether students were able to structure their slides in a clear and meaningful manner. The language criterion included the oral delivery component and the written slides component. Both fluent delivery and accurate slides form the basis of advanced presentation skills, which, in turn, allow the teacher to draw inferences about students' task fulfilment and engagement with the project.

Teacher's Project Supervision Log

Students were offered support during the semester through in-class project-related instruction and the discussion of questions. In addition, the teacher was available to students for resolving issues or clarifying aspects of the assignment throughout the project duration. A retrospective supervision log served as the final research method to complement student-produced data with teacher-produced reflections. The log was kept in note form with special situations and observations in mind.

Results

In total, 20 engineering students of aeronautics participated in the projects, and 14 students returned an evaluation form, which corresponds to a return rate of 70%. Students wrote five reports in groups of four and also presented their results in front of the class. Finally, 12 students evaluated the concept aircraft design of the group that had chosen this option.

Project Task Evaluation Survey

The project task evaluation survey yielded three different categories of results: first, a ranking of students' perceived fulfillment of the project's objectives; second, a ranking of the project components' importance for students; and third, students' free verbal clustered feedback on the project. As Table 1 shows, students perceived half of the project's objectives fulfilled with a rating above 3 on a 5-point Likert scale, 3 being the second-best rating option. They thus considered expanding subject-specific vocabulary (3.35), working with scientific literature (3.21), following a given template for writing scientific texts (3.21), and practicing techniques of literature search (3.07) as *greatly* fulfilled by the project.

Table 1. Ranking of Students' Perceived Fulfilment of the Project's Objectives

Ranking	Items rated on Likert scale (0–4)	M
1	Expanding subject-specific vocabulary in context	3.35
2	Working with literature on a scientific topic	3.21
3	Following a given template for writing scientific texts	3.21
4	Practicing techniques of literature search (books and journal articles)	3.07
5	Applying the IMRD model or another appropriate structure to the report	3.00
6	Peer-reviewing and editing written texts	2.92
7	Recognizing and implementing features and conventions of scientific writing	2.92
8	Adopting appropriate language, register, and style for scientific writing	2.85

Note: N=14; M=arithmetic average

Table 2 demonstrates that students attached paramount importance to the components *autonomy during the project phase* (3.78) and *allowing free choice of the project topic* (3.64). These were followed by *working in groups* (3.42), *linking the project with a concrete design task* (2.71), and *access to a sample report from a previous year group* (2.71), which all equal a description of *very important*. The group investigated thus showed a slight preference for autonomy rather than the core constructionist element in the design task.

Table 3 shows the collected and clustered free verbal feedback from the survey. Students chiefly commented on the aspects of scientific writing, content knowledge, group work, and autonomy. In general, students' statements were in favor of the way in which the project was conducted and the learning opportunities it offered.

Students' Final Project Reports

At the beginning of the project, the teacher and the students negotiated design specifications and mission

Table 2. Ranking of the Project Components' Importance for Students

Ranking	Items rated on Likert scale (0–4)	M
1	Autonomy during the project phase	3.78
2	Allowing free choice of the project topic	3.64
3	Working in groups	3.42
4	Linking the project with a concrete design task	2.71
5	Access to a sample report from a previous year group	2.71
6	Linking the project with a topic from a subject-specific course	2.50
7	Joint establishment of design specifications with course instructor	2.42
8	Joint establishment of evaluation criteria for design task with course instructor ^a	2.38

Note: N=14; M=arithmetic average; ^a missing values because of nonresponse: n=1

Table 3. Clustered Students' Free Verbal Feedback on the Project (Not Teacher Corrected)

Category	Students' feedback
Scientific writing	The project was a good task to improve the scientific writing skills ...
	The project was a very good preparation for further scientific tasks, such like bachelor thesis.
	Writing texts and giving presentations is the best way to improve/maintain qualities!
Objectives	Targets of the project should be defined more detailed
Content knowledge	During the project I earned a lot of topic-related knowledge ...
	At the beginning it seemed to be hard to find a topic which is fine for every group members. After some brainstorming it turned out that nearly every topic can be divided in subtopics for every group member so that everyone was able to work on his preferred task. This gave me the possibility to expand my knowledge on a special task, but also in the context of the whole topic.
Group work	The project was a good task [...] to learn working in a group.
	It was another good opportunity to work in groups (and therefore learn about its positive & negative aspects)
	It was very interesting and funny to work in teams.
Autonomy	During the project [...] it was a good experience to work autonomously on a topic which the project-group has chosen.
	Freedom of choice for the topics was also a good idea.
	+ free choice of project topic → being able to focus on fields of interest
	Thank you for allowing free choice of the project topic!
	The free choice of the project topic was very good, because in this way, it was possible to concentrate on thematics which weren't covered in lectures, so far.
	In this semester it was great that the students could choose their own topic and be relatively free in the choice of methods. Therefore it was possible to carry out a task that one prefers.

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requirements for the conceptual aircraft design challenge so that there would be equal conditions for all groups. Table 4 shows the outcome of these negotiations. It needs to be mentioned that in the framework of this educational assignment, it was impossible to include any

Table 4. Negotiated Design Specifications and Mission Requirements

Number	Negotiated design specifications and mission requirements	Technical data
1	Maximum length	80 m
2	Maximum wingspan	80 m
3	Minimum number of engines	2
4	Capacity (passengers)	200–300
5	Minimum cruising speed	700 km/h
6	New concept	
7	Economic feasibility	
8	Targeted service entry	2025
9	Noise levels reduced by 20% compared to similar modern reference aircraft	
10	Minimum of 4 measures to achieve this goal	
11	Consideration of present fuel consumption standards	

feasibility assessment of the concept aircraft except for students' peer feedback. The design specifications and mission requirements in the table, therefore, contained very general data and some broadly defined criteria, such as *economic feasibility* or *noise levels reduced by 20% compared to similar modern reference aircraft*, which could not and were not meant to be verified in this context.

Table 5 provides an overview of the final project reports written by students. The five project groups produced reports on very different subject matter, and only one group had chosen the conceptual design challenge option ("Conceptual design of a silent passenger aircraft"). Another group had described the "Development and manufacturing process of the JXP-VM," the scaled miniature model of an unmanned aerial vehicle designed by researchers and students of the author's university. A third group combined the two assignment options of using engineering software for the project and conducting a literature review on a topic of interest ("Parachute systems"). This group conducted a flow simulation of a parachute canopy profile with the computational fluid dynamics software ANSYS® CFX (2012) and ANSYS® ICEM CFD (2012). The remaining group reports ("High lift aerodynamics" and "Jet engine classification") constituted pure literature reviews according to the second assignment option.

The marks on the reports were generally good, with the exception of one satisfactory grade (see Table 5). These marks correspond to the Austrian 5-tier grading scheme of *excellent*, *good*, *satisfactory*, *pass*, and *fail*.

Table 5. Titles of Students' Final Project Reports

Title	Members	Short description	Pages	Mark
Conceptual design of a silent passenger aircraft	4	Conceptual design of a silent commercial aircraft according to jointly defined mission requirements with the software Rhinoceros® (2011)	43	Good
Development and manufacturing process of the JXP-VM	4	Documentation of the development and construction of an unmanned aerial vehicle miniature model (JXP-VM) in a flying-wing configuration to the scale 1:4	30	Satisfactory
High lift aerodynamics	4	Literature research on high-lift devices located at a wing's leading and trailing edges, including a discussion of the problems of weight and noise pollution	34	Good
Jet engine classification	4	Literature research on air-breathing engine types in commercial and military aviation	28	Good
Parachute systems	4	Literature research on parachute systems with a basic two-dimensional flow simulation of a ram air profile with the computational fluid dynamics software ANSYS® CFX (2012) and ANSYS® ICEM CFD (2012)	29	Good

The report “Conceptual design of a silent passenger aircraft” resulted in the full depiction of an innovative commercial airliner proposal by means of the software Rhinoceros® (2011), which can be seen in Figures 1 and 2. The group based its design on a good selection of relevant literature, yet the design itself could have been foregrounded and better linked with the source materials treated. In any case, the report provided a rather clear description of the design method, the use of the software, and the conceptual aircraft. The group also illustrated its report with 29 figures for further documenting its project activity.

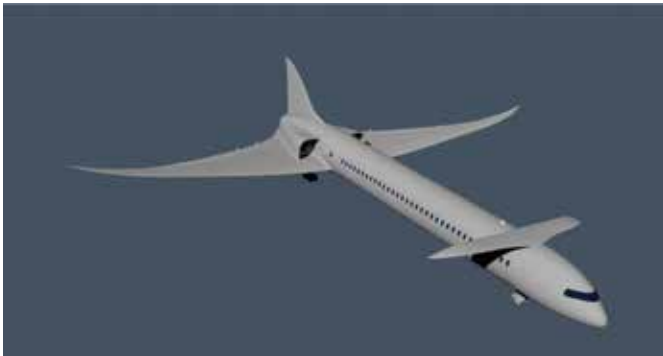


Figure 1. Students' Conceptual Design of a Passenger Aircraft Produced with Rhinoceros® (2011)

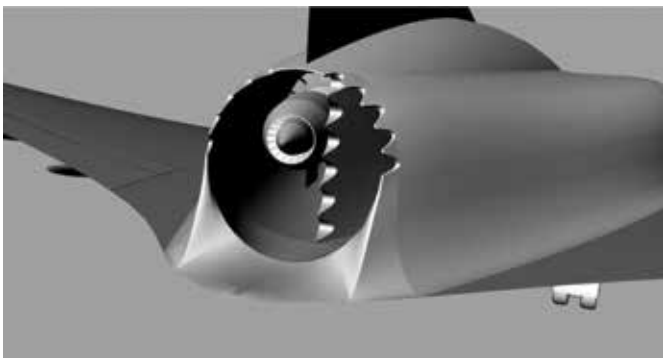


Figure 2. Detailed View of Noise-Absorbing Geometry Around the Engine Duct in the Tail Unit Produced by Students with Rhinoceros® (2011)

The report on “Parachute systems” was well organized and contained professional figures. The aerodynamic flow simulation with ANSYS® CFX (2012) and ANSYS® ICEM CFD (2012), however, could have been foregrounded and explained in more detail. The report on the “Development and manufacturing process

of the JXP-VM” constituted a useful process description for building a model airplane. It would have gained even more substance, though, by consulting further specialist literature. The literature review on “Jet engine classification” was characterized by a confident treatment of source materials and references as well as figures and text organization. The group further managed to reduce a complex topic to its essentials and still describe it in a precise way. The final report on “High lift aerodynamics” also showed a rather good command of source materials and references and described leading- and trailing-edge devices for efficient flow control on airfoils.

Students' Final Project Presentations

The students' final project presentations took place on 29 May 2012. All five groups presented their projects to the teacher and their peers, and the class evaluated the conceptual design group's drawing of a concept aircraft according to negotiated criteria (Table 6). Harris and Bell (1994) have pointed to the advantages of a public display of task results: “Not only is the judgment of products a normal activity within our society, in

Table 6. Negotiated Evaluation Criteria for the Conceptual Design Presentation

Number	Negotiated evaluation criteria	Points awarded (0–2)
1	Complexity of the design components (the more detailed the better)	
2	Technical feasibility	
3	Degree of innovation	
4	Compliance with current infrastructure	
5	Presentation of the design	
6	Number of noise-reducing measures accomplished	
7	Consideration of internal noise levels	
8	Consideration of external noise levels	
9	Fuel efficiency	
10	Design aesthetics	
Total		

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the context of education it also allows teachers to check and compare their results, an argument being that subjectivity is decreased” (p. 100). The group presentations lasted for 15 minutes each, with additional time for questions from the audience. This public display of project outcomes enabled the groups to share their work with others and thus enhance its value, as colleagues could also gain new insights and participate in the question-and-answer sessions.

The conceptual design group’s project received mixed and critical ratings from the other students. Out of a total of 20 possible points, the number of points awarded to the project ranged from 12 to 19. Four students had not evaluated the design concept.

The group presentations were well delivered and focused. In principle, most students presented fluently and freely without the help of moderation cards or notes except the slides visible on the computer screen next to them. The content of the presentations was closely aligned with the projects and tailored to the audience. Furthermore, the organization of the slides met professional standards and reflected a logical structure that facilitated information intake. The language used was appropriate for the aerospace industry and the context of in-class presentations. Several slides, however, contained spelling and punctuation mistakes.

Teacher’s Project Supervision Log

The teacher’s project supervision log contained entries on the introduction of the assignment; the joint definition of basic specifications for the aircraft and evaluation criteria for the design; a writing session; and student questions. The introduction of the assignment triggered positive but also skeptical reactions among students. The author explicitly asked learners what they thought about this project assignment, and they seemed to generally like the idea but raised concerns about workload. The joint definition of basic specifications for the aircraft to be designed and the related evaluation criteria resulted in eager student participation. Similarly, the in-class writing session managed to involve learners in the improvement of sample sentences, but learners had occasional difficulties with the formulation of accurate alternatives. Another observation from the project supervision log is that student questions revolved around submission criteria and organizational aspects rather than content and language.

Discussion

The methods applied suited the practitioner research setting with a small group of learners. The different tools employed yielded complementary and reciprocally supportive results, which mainly expressed students’ approval of the constructionist design task and project framework. This group of learners, thus, found didactic, organizational, and motivational merits in the current educational project design.

Discussion of Methods

The software package Rhinoceros® (2011) was a convenient choice for this assignment, as students had worked with this tool in a content course before and knew about its functionality. However, Rhinoceros® (2011) is rather a three-dimensional drawing program than professional engineering software for aircraft design. Originally, it had been the aim of this assignment to integrate design software used in the aerospace industry, yet students in this degree program do not encounter such software before their final year of studies. The constructionist project under discussion, however, formed part of a second-year (fourth-semester) English language course so that the adoption of authentic computer-assisted tools for aircraft design remained unfeasible at this pedagogic stage. Nevertheless, Rhinoceros® (2011) enabled the generation of three-dimensional shapes that could be combined to arrive at a technical drawing of an aircraft concept. This level of functionality proved sufficient for the current assignment.

The mixed-methods approach to the evaluation of the constructionist design project under investigation supported the adoption of quantitative and qualitative research perspectives. Even though the sample size was small and limited by the student year group size, the project task evaluation survey allowed a ranking of group answers to identify the statements most favored by students. The combination of the survey with the qualitative evaluation of students’ final project reports and presentations enabled a balanced viewpoint at this educational concept. A further qualitative perspective was delivered by the teacher’s project supervision log, adding the teacher’s notes, observations, and reflections to the otherwise student-produced data.

Discussion of Results

The results from the project task evaluation survey, the students' final project reports and presentations, and the teacher's project supervision log allowed an evaluation of this constructionist design project from multiple perspectives. In principle, all of these research tools revealed encouraging results concerning student approval, report quality, and motivation.

Project Task Evaluation Survey. The survey results related to the project's objectives as depicted in Table 1 suggest that students assigned very high degrees of fulfillment to lexical improvement and areas associated with scientific writing. Students thus acknowledged the constructionist project's suitability for expanding their technical terminology (rating of 3.35), working with scientific literature (3.21), following a given template for writing scientific texts (3.21), and practicing techniques of literature search (3.07). It should be mentioned that the remaining objectives, however, only received marginally lower ratings than those just discussed. This fact points to students' general perception of the project's effectiveness for English language learning. The questionnaire specifically asked for learners' ratings concerning the extent to which they had *personally* reached the objectives set so that these results emphasize considerable learning gains as detected by students.

The main reason for these high ratings may be grounded in the constructionist design task's alignment with this student group's learning style preferences. Such reasoning is supported by the results shown in Table 2, which focused on students' perceived importance of the project components listed. The fact that learners underlined the overriding importance of autonomy-related components such as *autonomy during the project phase* (3.78) and *allowing free choice of the project topic* (3.64) reinforces the pursuit of independent-learning principles in higher education settings. It further implies that these students appreciated the freedom to determine the exact content of their learning, organize the main project activities, and control the pace of their progress. It seems that these students profited greatly from the learner-centered approach adopted for the whole project assignment.

Furthermore, students clearly identified the collaborative aspect as crucially important, with a very high rating for *working in groups* (3.42). This result allows the assumption that learners favored collaboration with peers on a subject-specific project task. One of

the reasons for this preference may stem from the university's learning environment, which generally promotes team building and group tasks among students so that learners are accustomed to collaboration in certain variations. Another reason may be that learners are aware of the advantages of group work for capitalizing on the members' bundled knowledge, skills, and strategies for completing a project assignment. It is also possible that students appreciated the benefits of dividing the task into subtasks and sharing the responsibility for the final outcome.

Other components that learners considered to be very important were *linking the project with a concrete design task* (2.71) and *access to a sample report from a previous year group* (2.71). This suggests that engineering students appreciate language-learning scenarios that are integrated into engineering tasks. Founding language-learning objectives on content-learning components activates students' engineering knowledge and skills set, which equips them with confidence and familiarity stemming from their academic and professional comfort zones. This, in turn, increases task relevance and facilitates language learning because it is not detached from students' main area of interest but closely aligned with it. Such alignment, therefore, may reduce the risk of language-learning anxiety, foster learners' identification with the task, and thus increase the chances of successful language learning. Tertiary engineering students tend to enjoy technical tasks and content, which also bears great potential for language learning applications.

The remaining components on the survey received lower ratings, and it is startling that the *joint establishment of design specifications with course instructor* (2.42) and *joint establishment of evaluation criteria for design task with course instructor* (2.38) received the lowest ranking as the least important project elements. This is particularly astonishing as the negotiation of task components forms part of autonomy-oriented practice, a practice that was appreciated by students as mentioned before. This discrepancy may originate from students' preference for teacher control over certain framework conditions. On the other hand, students had expressed a strong desire for choice and participation in the topic selection of the project. This situation may be interpreted as an indication of the multi-faceted concept of autonomy, which is no monolithic block of uniform characteristics but an umbrella term with diverse constituents. As a consequence, it is perfectly

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possible and even probable that individual students identify with and endorse one element, while they reject or ignore others as not important, useful or engaging. Concerning the questions of choice and autonomy, thus, students seemed to favor the concept of *controlled choice*, a continuum from teacher-controlled cornerstones to learner-controlled building blocks.

Students' free verbal feedback gathered in the last part of the survey represents open responses to this constructionist project concept (Table 3). These comments support the premise that scientific writing is improved through collaborative constructionist project activity, as three students specifically and independently of each other stated. Furthermore, students confirmed the project's merit for expanding content knowledge in areas that had been previously neglected in content courses. In this way, the project offered students the opportunity to complement their curriculum-based aeronautical knowledge with explorative subject-matter learning derived from more intrinsic interests. As one student phrased it, the project allowed him or her to develop specialist as well as more holistic insights, to "expand [his or her] knowledge on a special task, but also in the context of the whole topic." The fact that students could work in groups was also mentioned as a rewarding experience. Most comments, however, referred to the aspect of autonomy during the project phase and the free choice of topic. Students very much appreciated the possibility of selecting the concrete content they were going to focus on. For one learner, "it was great that the students could choose their own topic and be relatively free in the choice of methods." Another learner added that this option of choice led to a concentration on areas "which weren't covered in lectures, so far." The free verbal feedback given by students, therefore, closely seconds the quantitative survey results.

Students' Final Project Reports. The quality of the student group reports was generally good but showed room for improvement in certain parts, such as organization, sentence construction, connectors, tenses, prepositions, register, and referencing. Nevertheless, the reports treated aeronautical subject matter in a lexically profound way with a rather precise choice of technical terminology. Furthermore, students selected or produced appropriate figures and tables to convey numerical or graphical information on the content of their reports. Despite interruptions of cohesion, the group reports

presented aeronautical content grounded in specialist literature at substantial lengths.

The analysis of these reports agrees with research on collaborative writing that emphasizes group writing advantages (see Fernández Dobao, 2012, p. 55). Storch (2013), for instance, points to "some evidence that L2 learners composing collaboratively tend to produce texts that are more accurate and of better quality than texts produced by learners writing individually" (p. 157). Even though there is no possibility of comparing the group results from the project reports with each member's hypothetical individual performance on the same task, most group reports are characterized by good quality student writing.

Another outcome of this project assignment is the subject-specific and linguistic construction of knowledge in the form of the written final group reports. The process leading to these reports was based on collaborative writing principles that, according to Storch (2013), "provide opportunities for authentic communication among learners, encouraging learners to deliberate about language while engaged in meaningful text production" (p. 171). Furthermore, particularly the group who had chosen the design option also trained and demonstrated their imaginativeness and creativity, two skills engineers should possess according to Meyer (1985, p. 25). Constructionism, thus, was present at several levels in the project: through students' research on aeronautical subject matter, the collaboration in groups, and the production of final reports.

Students' Final Project Presentations. The fact that students' final project presentations were in general well delivered and organized may be attributable to learners' previous experience with public speaking. All learners had given three presentations in English in the preceding three semesters before the current round of final presentations. However, the occurrence of several spelling and punctuation mistakes on slides implies that these aspects are either difficult to detect by students or simply a result of hasty preparation. Although the spell-checking function of presentation software would lead one to suspect that such mistakes are due to hasty preparation, this may not be the case, as students may not use the spell-checking function or ignore its suggestions. Furthermore, students may simply overlook misspelt words that have similar spelling in German, such as *process* and *Prozess*, or that are near-homophones in English, such as *insured* and *injured*.

The mixed ratings of the conceptual design group's project by other students suggest that peers were critical judges of aeronautical content. The whole class was fully aware of the drawing software's limitations for aeronautical design applications, yet they also posed questions about design inaccuracies during the question-and-answer session following the group presentation. Furthermore, they critically reflected on the feasibility and conceptual implementation of noise-abating design features. All in all, thus, the integration of peer rating in this form afforded students, both the design group and the rating group, the opportunity of critical subject-specific interaction and negotiation. In other words, this competitive aspect increased students' awareness of aeronautical design issues.

Teacher's Project Supervision Log. The results from the supervision log revealed some noteworthy observations. The introduction of the constructionist design assignment met with certain skepticism from the group, as it involved the application of software tools and thus additional workload for learners. The teacher attempted to convince learners that writing about a conceptual design task was well suited for engineering students and could thus be a motivating project. Nevertheless, only one group chose the original design task, and another one worked with software on a different subject. If all students had participated in the design option, this would have facilitated the comparability of project outcomes, yet learners rejected this suggestion and favored a free choice of options. The joint definition of basic specifications for the aircraft and evaluation criteria for the design was also characterized by high student participation and negotiation. Students agreed on a set of criteria that enabled the group who had chosen the conceptual design task to perform its work with concrete peer-defined aims.

Even though students had some difficulties with rephrasing sample sentences during the writing session, this unit seemed to demonstrate to learners that writing requires an intensive occupation with formulations, appropriate sentences, revising, restructuring, and editing before a paragraph becomes an acceptable unit. Students' questions during the project supervision, however, mainly focused on the organization of the report, referencing issues, and submission formalities. Linguistic questions were rare but sometimes posed in class or through email. Students may have felt confident with content and language or relied on peer reviewing,

which constituted a requirement in the project, for improving their texts. Furthermore, formalities were important for students for organizing their project activities according to schedule.

Conclusions

The main limitations of this study are its small scale and lack of generalizability. The sample size of 14 respondents to the questionnaire is too low to make inferences from the data to hold true for the population of aeronautical engineering students. However, this was not the intention of this practitioner research in the first place. Instead, it was attempted to describe a successful technical communication project and have its components evaluated by students who had experienced it as part of their tertiary aeronautical studies. Even though learning is a complex process influenced by many factors that are difficult to measure in quantitative approaches alone, mixed-methods data offer a more balanced view at educational aspects. The research presented here, thus, should rather serve as a case study with aeronautical students, and it is hoped that practitioners and professionals in similar contexts and cultural situations find confirmation, orientation or inspiration by this project design or some of its elements.

In conclusion, students' responses on the questionnaire revealed a tendency toward the conviction that language learning in general and scientific writing in particular are fostered through collaborative constructionist project activity. This student perspective is supported by the evaluation of students' final project reports, which showed good to satisfactory thematic, linguistic, and organizational quality. Furthermore, a didactic framework that promotes learner autonomy evolved as a central outcome of this practitioner research. Students seemed to enjoy the concept of *controlled choice*, a concrete task embedded in teacher-controlled instructions combined with students' choice of certain project elements, such as one of two project options, the organization of work, the subject matter, the detailed content, and the literature selected.

As the evaluation of this project suggests, constructionism seems to provide a favorable learning environment for engineering students. Engineering disciplines are professionally concerned with the production of results, goods, and services so that the integration of these aspects into tertiary language

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classrooms may be conducive to engineering students' motivation, engagement, and, in the end, learning success. As Winsor (1998) has argued, "[e]ngineers have a disciplinary commitment to achieving certain knowledge, even though their daily work teaches them that such certainty is always elusive and temporary. The object can always malfunction; it can always be improved" (p. 367). This commitment to and desire for the continuous improvement of products was clearly visible during the final project presentations, when students rated and commented on their peers' conceptual design of a commercial airliner with a rather critical stance. Students further seemed to enjoy the competitive aspect of rating and having rated the design project outcome by peers. This observation may be explained by a desire for measuring design success or product performance that many engineering students share (cf. Winsor, 1990, p. 60) and that competitions, games, and tournaments can satisfy.

However, there is also student criticism of project-based learning in the literature, mentioning increased workload and an inappropriate reversal of teacher-student roles, among other aspects (Beckett, 2002, pp. 60–61; Beckett, 2005, pp. 200–201; Tatzl, 2014, p. 15). Nevertheless, it seems that "ESP students learn English and content knowledge via the process of problem-solving, and this is consolidated by team-working and independent self-directed learning" (Anthony, 2011, p. 20). During the introductory session, students in this project also expressed some reservations about the constructionist design assignment, as the application of software tools was feared to cause additional workload for learners. In the end, though, learners realized that they had the choice between the design option and the literature review option, which turned workload resulting from the use of software into a voluntary and hence non-problematic matter.

Constructionism and autonomy evolved as facilitating factors of learning in this practitioner research. As a consequence, similar pedagogic settings may profit from the adoption of constructionist and learner autonomy principles in language classrooms. The collaborative production of knowledge through project work under conditions of controlled choice is thematically adaptable to any tertiary study context, which turns it into a flexible and versatile educational concept. This is particularly important for teaching because learners, groups, and institutions require

individual and tailored approaches to best cater for their educational needs.

Acknowledgments

I would like to thank the students who participated in this project for their dedication and openness. In particular, I am indebted to the student group that granted permission to include their drawings of the concept aircraft in this article. I would like to extend my thanks to the anonymous reviewers of an earlier draft of my article for their valuable comments.

References

- ANSYS® CFX, Analysis Software and CFD Solver Package (Version 13.0) [Computer software]. Canonsburgh, PA: Ansys Inc., 2012.
- ANSYS® ICEM CFD, Analysis and Meshing Software Package (Version 13.0) [Computer software]. Canonsburgh, PA: Ansys Inc., 2012.
- Anthony, E. M. (2011). Language learning: Collaboration in English for specific purposes (ESP) problem-based learning (PBL) classroom. In R. McColl Millar & M. Durham (Eds.), *Applied linguistics, global and local: Proceedings of the 43rd Annual Meeting of the British Association for Applied Linguistics: 9–11 September 2010: University of Aberdeen* (pp. 11–21). London, UK: Scitsiugnil Press; British Association for Applied Linguistics (BAAL). Retrieved from http://www.baal.org.uk/proceedings_10.pdf
- Atkinson, D. (2011). A sociocognitive approach to second language acquisition: How mind, body, and world work together in learning additional languages. In D. Atkinson (Ed.), *Alternative approaches to second language acquisition* (pp. 143–166). Abingdon, UK: Routledge-Taylor & Francis.
- Beckett, G. H. (2002). Teacher and student evaluations of project-based instruction. *TESL Canada Journal/Revue TESL Du Canada*, 19(2), 52–66.
- Beckett, G. H. (2005). Academic language and literacy socialization through project-based instruction: ESL student perspectives and issues. *Journal of Asian Pacific Communication*, 15(1), 191–206.
- Bednar, A. K., Cunningham, D., Duffy, T. M., & Perry, J. D. (1992/2009). Theory into practice: How do we link? In T. M. Duffy & D. H. Jonassen (Eds.),

- Constructivism and the technology of instruction: A conversation* (pp. 17–34). Mahwah, NJ: Lawrence Erlbaum.
- Behles, J. (2013). The use of online collaborative writing tools by technical communication practitioners and students. *Technical Communication*, 60(1), 28–44.
- Benjamin, C., & Keenan, C. (2006). Implications of introducing problem-based learning in a traditionally taught course. *Engineering Education: Journal of the Higher Education Academy Engineering Subject Centre*, 1(1), 2–7.
- Bloor, M., & St John, M. J. (1988). Project writing: The marriage of process and product. In P. C. Robinson (Ed.), *Academic writing: Process and product* (pp. 85–94). ELT Documents, Vol. 129. N.p.: Modern English Publications & The British Council.
- Brumberger, E., Lauer, C., & Northcut, K. (2013). Technological literacy in the visual communication classroom: Reconciling principles and practice for the “Whole” communicator. *Programmatic Perspectives*, 5(2), 171–196.
- Casey, A. (2012). Using project-based learning in English for specific purposes courses for automotive engineering students. In D. Tatzl, A. Millward-Sadler, & A. Casey (Eds.), *English for specific purposes across the disciplines: Practices and experiences* (pp. 46–63). Graz, Austria: Leykam.
- Chalifoux, J.-P., & Vinet, R. (1988). Engineering project design and communication skills. *Engineering Education*, 77, 308–310.
- Cognition and Technology Group (CTGV). (1992/2009). Some thoughts about constructivism and instructional design. In T. M. Duffy & D. H. Jonassen (Eds.), *Constructivism and the technology of instruction: A conversation* (pp. 115–119). Mahwah, NJ: Lawrence Erlbaum.
- Couture, B., Rymer Goldstein, J., Malone, E. L., Nelson, B., & Quiroz, S. (1985). Building a professional writing program through a university-industry collaborative. In L. Odell & D. Goswami (Eds.), *Writing in nonacademic settings* (pp. 391–426). New York, NY: Guilford Press.
- Denton, D. D. (1998). Engineering education for the 21st century: Challenges and opportunities. *Journal of Engineering Education*, 87(1), 19–22.
- Enkenberg, J. (2001). Instructional design and emerging teaching models in higher education. *Computers in Human Behavior*, 17(5–6), 495–506.
- Esch, E. (1996). Promoting learner autonomy: Criteria for the selection of appropriate methods. In R. Pemberton, E. S. L. Li, W. W. F. Or, & H. D. Pierson (Eds.), *Taking control: Autonomy in language learning* (pp. 35–48). Hong Kong, China: Hong Kong University Press.
- Fernández Dobao, A. (2012). Collaborative writing tasks in the L2 classroom: Comparing group, pair, and individual work. *Journal of Second Language Writing*, 21(1), 40–58.
- Fielding, J. P., & Jones, R. I. (2000). Graduate-level design education, based on flight demonstrator projects. *Aircraft Design*, 3(4), 217–238.
- Gorman, M. E., Johnson, V. S., Ben-Arieh, D., Bhattacharyya, S., Eberhart, S., Glower, J., Hoffmann, K., Kanda, A., Kuh, A., Lim, T. W., Lyrantzis, A., Mavris, D., Schmeckpeper, E., Varghese, P., & Wang, Y. (M.). (2001). Transforming the engineering curriculum: Lessons learned from a summer at Boeing. *Journal of Engineering Education*, 90(1), 143–149.
- Harris, D., & Bell, C. (1994). *Evaluating and assessing for learning* (Rev. ed.). Abingdon, UK: Routledge.
- Henschel, S., & Meloncon, L. (2014). Of horsemen and layered literacies: Assessment instruments for aligning technical and professional communication undergraduate curricula with professional expectations. *Programmatic Perspectives*, 6(1), 3–26.
- Holec, H. (1981). *Autonomy and foreign language learning*. Council of Europe Modern Languages Project. Oxford, UK: Pergamon Press.
- Jennings, A. (2012). Technical communication practitioner-student interaction: An opportunity for students to learn from the practitioners’ world of work. *Technical Communication*, 59(4), 324–333.
- Johns, A. M., & Swales, J. M. (1998). Past imperfect continuous: Reflections on two ESP lives. *English for Specific Purposes*, 17(1), 15–28.
- Jonassen, D. H. (1992/2009). Evaluating constructivist learning. In T. M. Duffy, & D. H. Jonassen (Eds.), *Constructivism and the technology of instruction: A conversation* (pp. 137–148). Mahwah, NJ: Lawrence Erlbaum.
- Kafai, Y. B., & Resnick, M. (1996/2008). Introduction. In Y. Kafai & M. Resnick (Eds.), *Constructionism in practice: Designing, thinking, and learning in a digital world* (pp. 1–8). Mahwah, NJ: Lawrence Erlbaum.

A Constructionist Teaching Project

- Kleifgen, J. A. (2013). *Communicative practices at work: Multimodality and learning in a high-tech firm*. Bristol, UK: Multilingual Matters.
- Larson, J., Birge, C., Huang, Y.-M., Sattler, B., Turns, J., & Yellin, J. M. H. (2009). Directed research groups as a means of training students to become technical communication researchers. *Technical Communication*, 56(2), 172–177.
- Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge, UK: Cambridge University Press.
- Legenhausen, L. (1999). Language acquisition without grammar instruction? The evidence from an autonomous classroom. *Revista Canaria de Estudios Ingleses*, 38, 63–76.
- Little, D. (1991). *Learner autonomy 1: Definitions, issues and problems*. Dublin, Ireland: Authentik.
- Little, D. (1995). Learning as dialogue: The dependence of learner autonomy on teacher autonomy. *System*, 23(2), 175–181.
- Meloncon, L., & Henschel, S. (2013). Current state of U.S. undergraduate degree programs in technical and professional communication. *Technical Communication*, 60(1), 45–64.
- Miller, C. R., & Selzer, J. (1985). Special topics of argument in engineering reports. In L. Odell & D. Goswami (Eds.), *Writing in nonacademic settings* (pp. 309–341). New York, NY: Guilford Press.
- Musa, F., Mufti, N., Latiff, R. A., and Amin, M. M. (2011). Project-based learning: Promoting meaningful language learning for workplace skills. *Procedia: Social and Behavioral Sciences*, 18, 187–195.
- Papert, S. (1993). *Mindstorms: Children, computers, and powerful ideas* (2nd ed.). New York, NY: Basic Books-Perseus Books.
- Paradis, J., Dobrin, D., & Miller, R. (1985). Writing at Exxon ITD: Notes on the writing environment of an R&D organization. In L. Odell & D. Goswami (Eds.), *Writing in nonacademic settings* (pp. 281–307). New York, NY: Guilford Press.
- Perkins, D. N. (1992/2009). Technology meets constructivism: Do they make a marriage? In T. M. Duffy & D. H. Jonassen (Eds.), *Constructivism and the technology of instruction: A conversation* (pp. 45–55). Mahwah, NJ: Lawrence Erlbaum.
- Quick, C. (2012). From the workplace to academia: Nontraditional students and the relevance of workplace experience in technical writing pedagogy. *Technical Communication Quarterly*, 21(3), 230–250.
- Rhinoceros® (Version 4.0 SR9, 9 March 2011) [Computer software]. Seattle, WA: McNeel North America, 2011.
- Ross, D. G., & Arnett, E. J. (2013). To do is to learn: The value of hands-on research in an introductory research methods course. *Programmatic Perspectives*, 5(2), 214–242.
- Sageev, P., Prieto, F., & Smaczniak, A. J. (1992). Technical communications in the engineering curriculum: An example of industry-university cooperation. In *IPCC 1992 Santa Fe: Crossing Frontiers: IEEE Conference Record*, pp. RT 6.2/110–117.
- Sheppard, S. D., Macatangay, K., Colby, A., & Sullivan, W. M. (2009). *Educating engineers: Designing for the future of the field*. San Francisco, CA: Jossey-Bass.
- Storch, N. (2013). *Collaborative writing in L2 classrooms*. Bristol, UK: Multilingual Matters.
- Tatzl, D. (2014). Case meetings for teaching English for specific academic purposes in a tertiary aeronautical engineering programme. *Innovation in Language Learning and Teaching*, 1–27. (advance online publication)
- Tatzl, D., Hassler, W., Messnarz, B., & Flühr, H. (2012). The development of a project-based collaborative technical writing model founded on learner feedback in a tertiary aeronautical engineering program. *Journal of Technical Writing and Communication*, 42(3), 279–304.
- Vincenti, W. G. (1990). *What engineers know and how they know it: Analytical studies from aeronautical history*. Baltimore, MD: Johns Hopkins.
- Widdowson, H. G. (1983). *Learning purpose and language use*. Oxford, UK: Oxford University Press.
- Winsor, D. A. (1989). An engineer's writing and the corporate construction of knowledge. *Written Communication*, 6(3), 270–285.
- Winsor, D. A. (1990). Engineering writing/ writing engineering. *College Composition and Communication*, 41(1), 58–70.
- Winsor, D. A. (1994). Invention and writing in technical work: Representing the object. *Written Communication*, 11(2), 227–250.
- Winsor, D. A. (1998). Rhetorical practices in technical work. *Journal of Business and Technical Communication*, 12(3), 343–370.

- Wong, L. L. C., & Nunan, D. (2011). The learning styles and strategies of effective language learners. *System*, 39(2), 144–163.
- Young, T. M. (2000). Aircraft design education at universities: Benefits and difficulties. *Aircraft Design*, 3(4), 207–215.
- Yu, H. (2010). Authentic assessment in technical communication classrooms and programs: Proposal for an integrated framework. *Programmatic Perspectives*, 2(1), 42–58.
- Zimmerman, B. B., & Paul, D. (2007). Technical communication teachers as mentors in the classroom: Extending an invitation to students. *Technical Communication Quarterly*, 16(2), 175–200.

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Manuscript received 26 September 2014; revised 18 February 2015; accepted 19 February 2015.

Like It or Not. What Characterizes YouTube's More Popular Instructional Videos?

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Abstract

Purpose: There is a tremendous growth in the production of instructional videos. This study investigates whether popular YouTube instructional videos for declarative knowledge development differ in their physical characteristics from unpopular and average ones.

Method: Sampling followed a three-step procedure. First, 250 YouTube videos aiming for declarative knowledge development were selected. Next, a formula for popularity rating was developed. After distinguishing three classes of popularity, the five most viewed videos for five types of declarative knowledge were selected. This resulted in a sample of 75 videos. After coding and scoring, statistical analyses were performed to discover differences between popularity classes in the physical characteristics of videos.

Results: Popular videos differed significantly from unpopular and/or average videos in the following ways: (1) higher production quality (that is, resolution); (2) more frequent presence of static pictures (both iconic and analytic); (3) more frequent presence of a combination of static and dynamic pictures; (4) more often short on-screen texts; (5) more often subtitling with different languages; (6) more frequent inclusion of background music; (7) less background noise; (8) faster speaking rate (that is, words per minute).

Conclusion: The sampled videos strongly varied in their physical characteristics. There were also many significant differences across popularity classes. The findings can be used to optimize video designs for popularity. In addition, they provide a starting point for further research on how physical characteristics may affect knowledge development.

Keywords: instructional video, design characteristics, declarative knowledge, YouTube, popularity ratings

Practitioner's Takeaway

- A formula with both viewer appraisals and viewing rates is introduced for gauging YouTube popularity.
- Seventy-five videos on declarative knowledge development varied hugely in the physical characteristics of resolution, visuals, verbal & sound, and tempo.
- Popular YouTube videos differed from average and unpopular videos on most of these physical characteristics.
- Designers may find the frequency findings and their discussion helpful for constructing (more) popular videos.

Introduction

This paper reports on a study of a particular type of YouTube video, namely instructional videos. More precisely, we closely examine the physical characteristic of YouTube videos that aim to support declarative knowledge development. Declarative knowledge includes factual and conceptual information. It is also characterized as “knowing that” and contrasted with procedural knowledge that refers to “knowing how” (Smith & Ragan, 2005).

YouTube provides statistics without making a distinction into video types. Even so a conservative estimate of the development rate of instructional videos for declarative knowledge development can be made. On YouTube 100 Hours of videos are uploaded every hour (“Statistics,” 2015). Assuming that this is at least a stable production rate (it is likelier to go up than down), and 10 percent of these videos addresses declarative knowledge development, this amounts to a production rate of 1.680 new videos each week and 87.360 each year. Because YouTube started in 2007, there is thus little doubt that a vast number of instructional videos can be found on its website.

Videos in general vary considerably in how well they are appreciated and how often they are viewed. Instructional videos are probably no different in this respect. This made us wonder whether there are certain characteristics that make some instructional videos more popular than others. To investigate this issue, we decided to conduct a systematic analysis, concentrating on the physical characteristics of video. This paper describes our approach to investigating these characteristics and their possible relationships with popularity. Our primary purpose was that of mapping the field. In addition, we believed that the findings might help designers in creating instructional videos that reach a large audience. Furthermore, the outcomes could give a glimpse of video characteristics that contribute to (stronger) knowledge development.

First, we address the question how to gauge the popularity of YouTube videos. Then a discussion follows about what physical characteristics we studied of the videos. A substantial part of the method section addresses the sampling of the 75 videos that were analyzed in detail. In the results, we define, illustrate and discuss each physical characteristic. The conclusion debates on what may be driving video popularity. In addition, we address some limitations of the study.

Popularity Ratings

YouTube gathers numerous statistics about the videos that are uploaded to its Web site. From the data that are publicly available, two quickly come to mind for gauging popularity: viewer appreciation and viewing rates. Both factors were included in the formula that we set out to create for obtaining popularity ratings.

The obvious first choice for a popularity rating is viewer appreciation. When we conducted our study, YouTube had changed its original five-star viewer rating into the Like or Dislike dichotomy. A like, displayed as a thumbs up icon, means that the viewer positively valued the video. A dislike means the opposite. It is displayed as a thumbs-down icon on YouTube. We included both variables in our formula.

Another factor that we included was viewing rates. From the data that YouTube provides on usage we took the variables Views and Shares. The View statistic represents the number of views a video has accumulated over its life span. The Share statistic stands for the number of times a video has been made available to others. There are at least three ways that YouTube counts a “share”: (1) a Web address is mailed to others, (2) a video is embedded in another Web page, and (3) a video or link is sent to other parties via Facebook, Twitter, Blogger, LinkedIn, and other social media.

We found mindboggling statistics for both viewer appreciation and viewing rates. Therefore, the basic frequency data for the variables in the formula (that is, Likes, Dislikes, Shares, and Views) were classified into five ordinal categories. With these values as input, the formula afforded us to make a distinction between unpopular, average and popular videos (see Method).

Physical Characteristics

Two recent attempts to classify instructional videos on their physical characteristics are directly relevant for the present study. One is the review of Ploetzner and Lowe (2012) on expository animations. The other investigation is the research of Swarts (2012), and Morain and Swarts (2012) on “how to” videos for software training.

Ploetzner and Lowe (2012) decided to conduct their inventory study of expository animations used in educational research because “there is still no systematic account of the main characteristics” (p. 781). An important characteristic of these animations is their instructional purpose. The analyzed studies predominantly used animations for developing declarative knowledge.

YouTube's More Popular Instructional Videos

The authors distinguished six main dimensions in how the subject matter was presented to the user: representations employed, abstraction, explanatory focus, viewer perspective, spatio-temporal arrangement, and duration. *Representations employed* stands for how information is conveyed to the user. The basic distinction is that between a visual and an auditory mode. *Abstraction* refers to the level of concreteness of the images. Iconic pictures are distinguished from analytic ones. *Explanatory focus* refers to the kind of information that is represented. A distinction is made between behavioral, structural and function-oriented expositions. With this dimension, the authors qualify the kind of knowledge that a video aims for. *Viewer perspective* concerns the issue whether an animation consistently retained a single perspective on the subject matter, or whether there were multiple views. The dimension *spatio-temporal arrangement* covers a broad range of features that cover spatial organization and timing. Among others, the dimensionality of pictures (for example, 2-D or 3-D) and the handling of pauses and chronology fall within this dimension. Also subsumed are aspects of production quality, such as the resolution of an animation. *Duration* is simply the length of the animation.

Swarts (2012), and Morain and Swarts (2012) analyzed YouTube videos for procedural knowledge development. More specifically, they concentrated on “how to” videos for software training. According to these authors, the rubric physical design encompasses three facets, namely accessibility, viewability and timing.

Accessibility refers to features that provide navigational support within the video. In other words, this facet deals with features that direct viewers to pertinent screen areas. Examples are croppings, headings, voice-overs, and zooms and pans. *Viewability* refers to the issue of production quality (that is, audio, video, and text). Features that belong to this facet are the presence or absence of imperfect recordings of sound and image, and resolution. *Timing* is characterized as the issue of pacing. Features are speed of the video, pace of the narration, and well-synchronized audio and video tracks.

The aforementioned studies investigated a fairly extensive set of physical characteristics. We decided to look for a framework with a more limited set of features that still represented the most critical basic characteristics. Our first step therefore involved pruning.

The dimension explanatory focus from Ploetzner and Lowe (2012) received a different place because we wanted to qualify of the goal of the video before

looking at physical characteristics. This dimension is now presented in the method section where we discuss different types of declarative knowledge development supported by video. Duration was also considered part of the descriptive data of each video. Finally, we decided to exclude the dimension of viewer perspective because such perspective changes were already rarely found by the authors (and we also hardly found any).

In our view, the categories discussed by Swarts (2012) mainly represented more advanced physical characteristics of video (such as zooming and cropping) rather than the basic ones that we were interested in. In addition, most of the features that Swarts discussed hinged on interpretation, while we aimed for features that could be objectively assessed. For instance, his interest in the voice-over primarily stemmed from the functional role this feature could play in directing the viewer's attention to pertinent screen information.

With these considerations in mind, we decided to investigate the following physical categories: resolution, visuals, verbal & sound, and tempo (see Table 1). Below we briefly describe each category and we point out the relationships with the aforementioned frameworks. Detailed descriptions and illustrations of our own framework are presented in the results section.

Table 1. Characterization of the Physical Features

Feature	Characterization
Resolution	The number of pixels used in presenting screen objects (that is, 1080 HD)
Visuals	The pictorial information in the video (for example, 480p, static and dynamic pictures)
Verbal & Sound	The presence of audio, and written and spoken words in the video (for example, on screen text, subtitles, audio)
Tempo	The pace of the video (for example, narrative speed)

Resolution is a critical feature for assessing the production quality of a video. Swarts (2012) briefly mentions video resolution. Ploetzner and Lowe (2012) distinguish between two types of resolution: temporal and spatial. Temporal resolution denotes the number of picture elements per unit of time, such as the number of frames per second. This resolution is important for perceiving animations as continuous, among others. Spatial resolution denotes the number

of picture elements per unit of length, such as dots per inch. It is important for perceiving pictures as sharp and for distinguishing details. YouTube videos give no information about temporal resolution, but they do provide the data for spatial resolution. In this study we therefore concentrated on this aspect of resolution.

The category *visuals* stands for the pictorial representations used in the video. Within this category a further distinction is made between static and dynamic displays, and between real or realistic and abstract representations. This main category, and the distinction between static and dynamic displays, is also present in Ploetzner and Lowe's (2012) dimension of "representations employed." In their classification abstractness is a separate dimension. Since it referred only to pictures, we grouped it under visuals.

The category *verbal & sound* stands for the written text and auditory mode in which the videos convey information. We have chosen to include all written text under this category because the information primarily comes from the verbal representation. Ploetzner and Lowe (2012) classify written texts as visuals. The inclusion of subtitles makes our classification for written text more extensive than that of Ploetzner and Lowe. The difference probably stems from the fact that their animations were (made) suitable only for a dedicated audience, whereas YouTube videos are intended for a large and worldwide audience that can be reached only if the videos include subtitles and language translations. Ploetzner and Lowe (2012) distinguish three types of audio, namely sound (that is, nonverbal information), speech (that is, verbalizations that were part of the animation), and narration (that is, verbalizations about the narration). Our framework simply refers to the latter two as narration.

Tempo is a vital aspect of the temporal characteristic of video. The feature that we extracted from Ploetzner and Lowe's (2012) discussion on this matter is pauses. Pauses are important signs of event boundaries. In addition, they can help viewers better process the video by giving them some time for letting the information sink in. Only Swarts (2012) specifically addresses narrative speed, arguing that pace should be neither too quick or too slow. Our own framework includes both pauses and narrative speed as features of tempo.

We believe that the four categories of resolution, visuals, verbal & sound, and tempo exemplify a representative and meaningful choice from the physical constituents of video. Another reason for choosing

precisely these characteristics was that the analyses could be done objectively. Coding required little interpretation. Analyzing YouTube videos that vary in popularity on these physical characteristics is seen as a first step toward better understanding what makes some videos more popular than others. Because of the exploratory nature of our study, no a priori hypotheses were formulated.

Method

Data Sampling

Sampling the YouTube videos was done in three steps. First, a large database was formed with instructional videos for declarative knowledge development. The leading selection principle was that the videos should have an instructional aim and addressed factual and conceptual knowledge rather than procedures or attitudes. Second, a formula was created to obtain a popularity rating for each video. The formula combines viewer appreciation and viewing rates. It yields a score that is a combination of the number of likes, dislikes, views and shares. Third, a classification rubric was constructed for grouping each video. This rubric distinguished between five cognition types and three popularity classes. After thus classifying each video from our initial sample of 250, in each cell the five videos with the largest number of views, a total of 75 videos, was selected for detailed analyses. The steps are detailed below.

Step 1: Selection of Instructional Videos on Factual and Conceptual Knowledge. Swarts (2012) recently conducted an analysis of YouTube videos for procedural knowledge development, or "knowing how." Our focus was on a different set, namely YouTube videos for factual and conceptual knowledge development. An important characteristic of these videos is their emphasis on explanation. These videos primarily address "knowing that."

For classifying the videos on the type of knowledge that was presented, we departed from the widely accepted, adapted version of Bloom's taxonomy (Anderson et al., 2001). The taxonomy makes a fundamental distinction between factual and conceptual knowledge. Factual information concerns isolated bits of information. These bits are the basic elements that people need to understand things. Conceptual information is more complex. It revolves around relationships between elements and the larger structure that enables elements to function together. Within each class, a further subdivision is possible.

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For factual information, a distinction can be made between terms and facts. The first includes discussions about domain-specific terms (for example, an explanation of the terms row, field, data value in a video on database terms). The latter refers to an enumeration of facts or findings (for example, historic dates in a presentation on World War 1).

For conceptual information, a distinction can be made between concepts (classifications and categorizations), principles (principles and generalizations), and models (models, theories and structures). Videos about concepts may present different learning styles or music styles. Videos on principles may discuss how inflation comes about, or how gravity works. Videos about models may discuss evolution theory, or explain Maslow's theory of need.

Two broad classes of instructional videos were excluded from sampling: lectures and documentaries. Both have unique characteristics that set these videos apart from other instructional videos (see Guo, Kim, & Rubin, 2014).

In addition to the main aspect of content, our first selection of videos was based on four criteria. One was *language*. Only videos in Dutch or English were included because the researchers were fluent in only these languages. Another criterion concerned *video length*. A maximum of 30 minutes was adopted, mainly for practical reasons. As we will discuss later, video length is an important factor in viewing rates and presumably also for viewer appreciation. The 30-minute criterion safeguards against low scores on both factors due to video length alone. A fourth criterion was *intended audience*. We decided to focus on videos for an audience of young adults of 12 years and older. When words like "for kids" and "children" appeared in the title, the video was excluded from sampling. The fifth criterion concerned *baseline measures*. Only videos were selected that had been online for one month or longer and had received at least 1000 views and 25 ratings (likes and/or dislikes). This criterion was chosen to enhance the validity of the sample. For the same reason we included maximally five videos per subject matter, and per channel or uploading account.

Our search began with putting the browser setting on incognito mode. This setting avoids obtaining personalized results depending on cookies, browsing history, networks and the like. Next, we opened the YouTube Web site and typed keywords in the search window. The taxonomy helped us in formulating keywords that would yield instructional videos. That

is, we searched for videos that included words like "explanation," "understanding," "why," "terms," "principle of," "structure," "categories," "models," and "theories."

The search results were then screened for their title, the number of views, and we engaged in a quick perusal of the content of the videos. When this initial inspection did not lead to a clear decision on inclusion or exclusion, the video was viewed in more detail. For all five cognition types, we assembled the same number of videos, until a total of 250 videos was initially sampled. These videos were downloaded with the program 'Free YouTube Download v. 3.2.29. build 303' and saved as mp4-files. Each video also received a unique ID that was kept along with pertinent YouTube statistics on channel, upload date, duration, view count, and viewer rating.

Step 2: Assessment of Video Popularity. YouTube collects and publicly posts data that can be used to assess video popularity. One of these measures is viewer ratings, of course. When we started our study, YouTube had already changed its original five-star rating into a system in which the viewer can express appreciation by selecting a thumbs-up (Like) or thumbs-down (Dislike) icon.

Another measure that can be used to gauge popularity is viewing rates. The number of times a video has been seen is another signal of its popularity. As indicated earlier, the sampling procedure excluded videos with fewer than 1000 views. This criterion was chosen to safeguard against low viewing rates. In addition, it prevented the inclusion of videos with the problematic score of 301 views (see "Here's why the view count," 2014). The third measure of popularity that we included in our formula was the number of times shared. Sharing a video is a sign of appreciation. However, the statistic does not reveal whether this is done because the video is liked or disliked.

The following formula for assessing a popularity rating was constructed: $PR = (2Lr + V + S)/4$. PR stands for popularity rating. The variable Lr in the formula represents a Like-ratio. For likes (L) and dislikes (D) we computed this Like-ratio with the formula $Lr = (L/(L+2D))*100$. Dislikes were counted twice in the Like-ratio because we assumed that such ratings are less common, if only because viewers may shy away ('not worth the time') from videos that receive a considerable number of dislikes. The variables V and S in the formula stand for, respectively, the number of views and the number of times shared. By including both appraisals and usage date, the formula should give a more robust assessment of popularity than when only one of these measures is included.

The variables in the formula (that is, L_r , V and S) showed tremendous variations in their frequencies. This prompted us to create an ordinal scale with five categories (1 to 5) for each variable. For instance, we coupled the frequency data for views to a category coding in the following way: 1.000 – 10.000 views = category 1; 10.001 – 100.000 views = category 2; 100.001 – 1.000.000 views = category 3; 1.000.001 – 10.000.000 views = category 4; > 10.000.001 views = category 5. In addition to clustering the diverse raw scores, the ordinal scaling also served the purpose of giving an equal weight to user appraisals and viewing rates in the formula. The popularity rating (PR) that resulted produced a score between 1 and 5 for each video. When the PR-score of a video fell respectively in the range of 1 - 2.3, 2.4 – 3.6, and 3.7 – 5, it was classified as unpopular, average, or popular, respectively.

Although the formula uses a ratio to compute popularity ratings, older videos on YouTube might still score higher because they can collect viewing rates longer. To check this possibility, we computed the correlation between days on YouTube (based on the upload date) and our popularity rating. This yielded a significant but negative correlation, $r(N=75) = -0.32$, $p = 0.002$. The sampled unpopular and average videos had been posted on YouTube for respectively a mean of 1317 days (s.d. 733) and a mean of 1355 (s.d. 705) days. Time online did not differ for these two popularity classes. In contrast, popular videos had been posted for a mean period of 752 days (s.d. 721), which differed significantly from the unpopular ones, $F(1,49) = 7.54$, $p = 0.008$, as well as the average ones, $F(1,49) = 8.91$, $p = 0.004$. This finding therefore indicates that the popularity rating is not favoring videos with a longer YouTube presence.

After classifying each video as primarily addressing one declarative knowledge type and classifying its popularity class, all videos were organized accordingly. That is, each of the 250 videos was placed in the proper cell of the 5*3 (knowledge *popularity class) matrix. This led to a minimum of 15 videos in each cell.

Step 3 - Selection of the Most Viewed Videos.

From each cell of the 5*3 matrix, the five videos with the largest number of views were selected for inclusion. This resulted in a total of 75 videos. Inter-rater agreement on the classifications for knowledge type was computed by comparing the scores of the two researchers on all videos. Cohen's (weighted) Kappa

was computed to assess reliability. A Kappa score above 0.61 is generally considered a sign of satisfactory reliability. An outcome of $\kappa = 0.68$ was found for the basic distinction between factual and conceptual information. This indicates that the basic classification could reliably be made. Within subclasses, coding was unreliable, however. For terms and facts the outcome was $\kappa = 0.45$. For concepts, principles and models the score was $\kappa = 0.28$. Here the distinction between principles and models was especially problematic. When these were grouped together, a Kappa score of 0.66 was obtained. In view of these findings, we report only the outcomes for the basic distinction between factual and conceptual information.

Codebook

Registration and analyses of the characteristics of the videos was supported with a codebook that described how to code and score a video on its external properties, and physical characteristics.

External Properties. These properties include descriptive data and viewer statistics that are important to locate and identify a video, along with findings about usage and appraisals. After giving each video a unique ID, pertinent data on these aspects provided by YouTube were recorded. Thus, we registered descriptive data such as the URL, channel, title, subject language, video length, upload date, and download date. Also, we included statistical data about appraisals and usage such as views, likes, dislikes, times shared, average time watched, and channel members.

Physical Characteristics. An objective description is given of the physical quality, types of words and pictures, and temporal aspects. The four main categories are: resolution, visuals, verbal & sound, and tempo (see Table 1).

The codebook provides a detailed description and illustration for coding and scoring each physical facet. Two coders (one of the researchers and a University graduate) assessed inter-rater agreement on the physical characteristics that were studied. First, each coder independently of the other coded six randomly selected videos on all the physical characteristics. Next, Cohen's (weighted) Kappa was computed to assess reliability. Only natural pauses yielded a very low Kappa (that is, $\kappa = .37$). This flags that features as unreliably coded. All other features yielded Kappa scores of $\kappa = 0.66$ and higher.

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Data Analyses

Comparisons between the three popularity classes for descriptive variables either involved Chi-square (χ^2), Mann-Whitney (U-statistic), Kruskal-Wallis, or ANOVAs, depending on the nature of the data. Before conducting an ANOVA, the assumption of homogeneity of variance was examined (Levine's statistic). All analyses were two sided with alpha set at 0.05. Only the test outcomes for statistically significant findings are reported.

Results

Description of the Sampled Videos

Seventy of the 75 sampled videos were in English, five were in Dutch. The videos originated from 62 unique YouTube channels. They covered a diverse set of 72 unique topics that included atoms, black holes, diabetes, inflation, impressionism, kidneys, learning styles, music styles, neurons, satisfaction, stress, telephone, types of irony, and World War 1.

The average video length was 3 minutes and 35 seconds (range 0:29 – 20:41). Video length was slightly, but not significantly longer for more popular videos (Unpopular 4:42; Average 5:07; Popular 6:55). Mean watch time was 55.6% (available only for 20 videos). Video length and watch time correlated significantly, $r = -0.51$. The finding indicates that viewers watched a smaller percentage of longer videos. This is a common outcome as reported in studies where viewer statistics are mined for viewing patterns (e.g., Guo et al., 2014; Wistia, 2012). The overall mean time online was 3 years and 2 months (range 39 days – 7 years and 7 months). As discussed earlier, there was a significant difference for presence with popular videos being shorter online than unpopular or average ones.

Table 2 presents the *PR-scores* for each popularity class across the two main types of declarative knowledge

(that is, factual, conceptual). The three popularity classes differed significantly on this rating, $F(2, 69) = 427.802$, $p < 0.001$. Planned contrasts revealed that the PR-score for unpopular videos was significantly lower than for average, $t(72) = 15.00$, $p < .001$. Likewise, the PR-score for average was significantly lower than score for popular, $t(72) = 13.70$, $p < 0.001$. These findings support the validity of the PR-score.

Analyses further revealed an unexpected main overall effect for knowledge type, $F(1, 69) = 7.45$, $p = 0.008$. Videos with factual information received a higher PR-score than videos with conceptual information. There was no significant interaction between knowledge type and popularity class on the PR-score.

Table 2. Mean PR-Score (Standard Deviation) per Popularity Class and Declarative Knowledge Type

	Unpopular	Average	Popular	Total
Factual	1.84 (0.35)	3.13 (0.23)	4.55 (0.32)	3.17 (1.16)
Conceptual	1.50 (0.38)	3.06 (0.25)	4.33 (0.36)	2.96 (1.21)
Total	1.63 (0.40)	3.09 (0.24)	4.42 (0.35)	3.05 (1.19)

Note: Each cell in the Factual row presents the PR-score for 10 videos; each cell in the Conceptual row presents the PR-score for 15 videos.

Raw Scores for the Variables in the PR-Formula

Table 3 presents the basic statistics of the variables in the PR-formula. The data show that the sampled videos have been seen by hundreds of thousands of viewers. Only a very small percentage of these viewers gave like or dislike ratings. Also, like ratings (1.1%) were considerably more common than expressions of dislike (0.03%). Times shared took on a middle position with a mean of 0.17%.

Invariably the standard deviation was higher than the mean score. This signals huge frequency differences within and across groups. These differences also show up

Table 3. Mean Frequency (Standard Deviation) for Views, Likes, Dislikes and Times Shared per Popularity Class

	Unpopular	Average	Popular	Total
Views	235.483 (985.134)	165.173 (223.300)	2.484.266 (2.592.252)	961.641 (1.919.896)
Likes	78 (140)	309 (537)	31.884 (36.068)	10.757 (25.460)
Dislikes	80 (187)	36 (73)	861 (9549)	326 (671)
Times shared	10 (15)	44 (67)	3.229 (3.663)	1.708 (3.083)

Note: Each popularity class contains 25 videos.

in the findings for range. For instance, where the least viewed video had been watched 1.451 times, the most viewed one had been looked at more than nine million times. 9.340.314 to be exact.

For *views*, a striking difference between groups was that popular videos had been watched at least ten times more often than unpopular or average ones. The comparison is statistically significant, $U = 1.212$, $p < 0.001$. For *likes* and *dislikes* the unpopular video stands out in comparison with the average and popular video, $U = 1.247$, $p < 0.001$. Unpopular videos are appreciated with almost the same percentage for likes (49.3%) and dislikes (50.7%). In contrast, average and popular video both have a high percentage of favorable ratings (respectively 89.5% likes and 97.3% likes).

Physical Characteristics: Resolution

The resolution is the number of distinct pixels in which screen objects are presented. As of November 2008, YouTube supported 720p HD. From that time, it also changed its display ratio to the current widescreen format of 16:9. The resolution data shown in Table 4 are those of the highest production quality of the sampled videos. As can be seen from the table, popular videos are predominantly (84%) produced in High Definition (HD) quality.

There is a significant difference between popularity classes for resolution, $\chi^2 (6, N=75) = 37.0$, $p < .000$. Unpopular videos have a lower mean resolution than average videos, ($\chi^2 (3, N=50) = 19.0$, $p < .000$). In turn, average videos have a lower mean resolution than popular ones, $\chi^2 (3, N=50) = 19.9$, $p < .000$.

Table 4. Percentages* of Physical Features per Popularity Class

		Unpopular	Average	Popular
Resolution	< 480p	56	28	12
	480 p	12	40	4
	720p (HD)	24	24	20
	1080 (HD)	8	8	64
Visuals	Static pictures (total)	44	52	92
	- Iconic	40	36	76
	- Analytic	16	28	66
	Dynamic pictures (total)	76	72	80
	- Real or realistic	32	44	48
	- Animation	52	40	56
Verbal & Sound	Both static & dynamic pictures	28	28	72
	Title	68	72	44
	On screen text (total)	60	84	92
	- Short	40	44	72
	- Long	24	52	32
	Subtitles (total)	88	100	100
	- Fixed	28	4	4
	- Optional native language	52	80	20
	- Optional more languages	8	16	76
	Audio (total)	100	100	100
Tempo	- Narration	72	96	96
	- Music	64	40	80
	- Sound	16	16	32
	- Noise	33	36	4
	Narrative speed	125.5 (16.9)	131.8 (40.7)	172.0 (37.4)
	Natural pauses	84	87	41

* For narrative speed the mean (standard deviation) words per minute is presented.

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Physical Characteristics: Visuals

The category visuals encompasses the pictorial information in the videos. Two videos did not contain any pictures at all. One of these dealt with the topic of irony. The other discussed types of music. Both were strictly verbal presentations with some of the spoken text also appearing on screen.

We discuss the various types of pictures below. In coding, we systematically registered only their physical presence or absence. We did *not* also code their instructional relevance. Because we believe that readers will nevertheless want to get an impression of this facet, we describe pictures serving a functional role and pictures with a decorative function. In visuals, a distinction was made between *static* and *dynamic* pictures.

Physical Characteristics: Visuals - Static Pictures.

Static pictures, or stills, are single images without motion. A significant difference was found between popularity classes for static pictures, $\chi^2 (2, N=75) = 14.1$, $p = 0.001$. As Table 4 shows, static pictures were nearly always present in popular videos, whereas their presence in unpopular and average videos was about fifty-fifty.

Two kinds of static pictures are distinguished: iconic and analytic ones (compare Ploetzner & Lowe, 2012). The term *iconic picture* refers to illustrations that resemble real objects (see Figure 1). Iconic pictures include displays such as schematic, realistic and photo-realistic pictures. An example of a functional iconic picture is the display of a Van Gogh painting in a video on impressionism. An example of a decorative one is the display of a discount label in a video that explains the concept of discount in the thermodynamic system of entropy. Comparisons between the three popularity classes revealed the presence of a significant difference, $\chi^2 (2, N=75) = 9.7$, $p = 0.008$. Iconic pictures appear more often in popular videos than in unpopular or average ones.

The term *analytic picture* refers to illustrations that symbolize objects or states. Analytic pictures include displays such as charts, diagrams, graphs and maps (see Figure 2). An example of a functional analytic picture is the display of a chart illustrating the increased use of hydraulic fracturing in gas and oil recovery from deep layers of the earth in a video on fracturing. Another example of a functional analytic picture is a display of a shared field for customer identity in two databases in a video on database concepts. Analytic pictures were predominantly functional. A rare decorative analytic picture that we encountered was a flow chart of a

computer program. It served to illustrate that computers can do innovative things. Comparisons between the three popularity classes revealed the presence of a significant difference, $\chi^2 (2, N=75) = 915.8$, $p < 0.001$. Analytic pictures appear more often in popular videos than in unpopular or average ones.



Figure 1. An Iconic Picture from a Video Titled “Why Things Are Creepy” (source: <https://www.youtube.com/watch?v=PEikGKDVscC>)

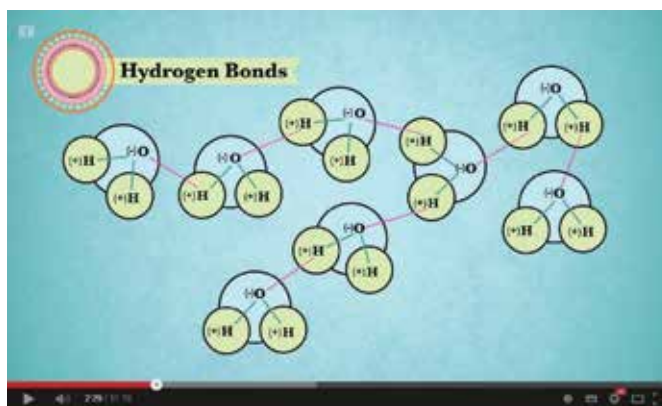


Figure 2. An Analytic Picture from a Video Titled “Water – Liquid Awesome” (source: https://www.youtube.com/watch?v=H-VT3Y3_gHGg&list=PLlc7tSC02aDENsUh4r0UE49RUtcLrBfb0).

Physical Characteristics: Visuals - Dynamic Pictures. Dynamic pictures show change over time. There is considerable educational debate on the question whether dynamic pictures better achieve instructional goals than static ones. It is generally argued that dynamic representations are favored for conveying temporal order and spatial relations (e.g., Arguel & Jamet, 2009; Höffler & Leutner, 2007; Tversky, Bauer-Morrison, & Bétrancourt, 2002). Because it has been found very

difficult to realize equal conditions in experimentation, so far empirical evidence supporting this stance is found lacking. About three of four videos included *dynamic pictures*. No difference was found between popularity classes for these pictures. Two kinds of dynamic pictures are distinguished: real and animated.

Real or realistic dynamic pictures present real-world images that display time-related modifications. A good example of functional usage of such dynamic pictures is a video in which the viewer gets to experience creepiness from watching three humans who turn their face towards the viewer to reveal the scary masks they are wearing. A decorative usage of dynamic pictures is the use of flipping or rotating screenshots of newspaper articles on loss of data and stolen CDs in a video on computer security. Comparisons between the three popularity classes revealed no significant difference for these pictures.

Animations consist of sets of highly similar stills whose rapid presentation creates the illusion of change over time. An example of functional usage is a video that employs realistic animations to show how messages are transmitted across the human nervous system. Functional animations were also found in a TedEd video about the production of tears. Animations mainly served a decorative role in a video where an animated presenter made movements that had nothing to do with the talk he was giving on differentiated instruction. There were no significant differences between popularity classes for the presence of these pictures.

Physical Characteristics: Verbal & Sound

The category verbal & sound includes the presence of written and spoken words in the video. The main distinction here is that between title, on screen text, subtitles and audio.

Physical Characteristics: Verbal & Sound – Title.

The subcategory *title* refers to the presence or absence of a video title or name. Table 4 shows that a considerable percentage (38%) of the videos did not display their title. Popular videos had the lowest score here, but there was no statistically significant difference between popularity classes.

Physical Characteristics: Verbal & Sound – On Screen Text. The subcategory on-screen text refers to all verbal information presented on the screen, the title excepted. Almost eighty percent of all videos presented some verbal information to the viewers. Comparisons between the three popularity classes revealed the

presence of a significant difference, $\chi^2 (2, N=75) = 8.2, p = 0.016$. Unpopular videos less often included on-screen text than popular ones, $\chi^2 (1, N=50) = 7.0, p = 0.008$.

Within the class of on-screen text, a further distinction was made between *short* and *long* texts. The difference between the two shows up in their presentation and in the main role that such texts appear to play. Short texts come in the shape of labels or annotated pictures (see Figure 3). The information for viewers to read is very short. Usually just a single word is presented. The labels and annotations support the visual information on the screen. They provide a name or term to a displayed picture or object therein.

Fifty-two percent of the videos carried short texts (see Table 4). Comparisons between the three popularity classes revealed the presence of a significant difference, $\chi^2 (2, N=75) = 6.0, p = 0.048$. Short texts are more common in popular videos than in unpopular or average ones, respectively, $\chi^2 (1, N=50) = 5.1, p = 0.023$, and $\chi^2 (1, N=50) = 4.0, p = 0.045$.

Long texts generally come in the shape of slides or written messages (see Figure 4). The text on these slides or messages is presented all at once or gradually appears on the screen (for example, in an animation of writing). Long texts almost always carry the main message. When there are also visuals on the screen, these tend to support the text rather than the other way around. Thirty-six percent of the videos presented long texts. These texts more commonly appeared in average than unpopular or popular videos. However, comparisons between the three popularity classes revealed no significant difference.

Physical Characteristics: Verbal & Sound –

Subtitles. The subcategory subtitles refers to the affordance of presenting the spoken words in on-screen text. Depending on the setting, subtitles can be obtained in the original language, or in translated form.

YouTube can automatically generate subtitles. With poor audio this yields poor subtitles which can lead to funny mistakes such as when the spoken “human anatomy - neuron” is subtitled with “human anatomy you’re on”. (Later on YouTube got this keyword right and subtitling became excellent for this video on neurons.) By and large, the automatic subtitling worked fine, except for jargon. For instance, we found the word “fluid” subtitled as “do it,” the phrase “bearish and bullish” subtitled as “parish and bullish,” and “considerable energy” subtitled as “consider a battery.” We also found one odd instance in which a video with

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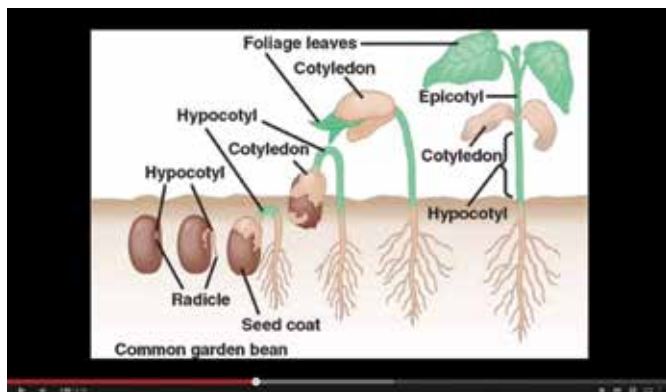


Figure 3. An Annotated Static Picture from a Video Titled “The Seed Germination Process” (source: https://www.youtube.com/watch?v=3lj1eW_gsrM).



Figure 4. A Long Text in the Form of a Slide from a Video Titled “What Is Irony?” (source: <https://www.youtube.com/watch?v=b0njd120MjY>).

an English narrative, presumably spoken by someone from India, automatically caused YouTube to subtitle the video in German. YouTube seems to experience considerable difficulties in subtitling videos with a Dutch voice-over. That is, for the five Dutch videos in our sample, we found the subtitling extremely poor.

To optimize subtitling, it is recommended to include a transcript with the video. Besides improving the subtitling, transcripts play two other important roles. Both concern accessibility. One advantage is that a transcript can create more traffic to the video because the keywords in the transcript can easily be picked up by search engines. The other advantage is that the presence of a transcript makes a video more accessible for people who might not (be able to) listen to the audio or watch the video.

Virtually all videos came with subtitles. Four percent of the videos had no subtitles. The affordances

for handling the available subtitling options varied considerably. Twelve percent of the videos were equipped with fixed subtitles. Viewers cannot choose whether or not to display subtitles in these videos. When fixed, the subtitles automatically appear on the screen, always in the native language of the video. Fifty-one percent of the videos included the option to switch on or off the presentation of subtitles in the native language (see Figure 5). The remaining thirty-three percent of the videos offered the viewer the broadest choice. In these videos viewers could switch the presentation of subtitles on or off, and they could select the language of the subtitles (see Figure 6). With this option viewers can obtain subtitles in translated form.

Popular videos predominantly gave viewers the most extensive set of choices for subtitling. In contrast, most

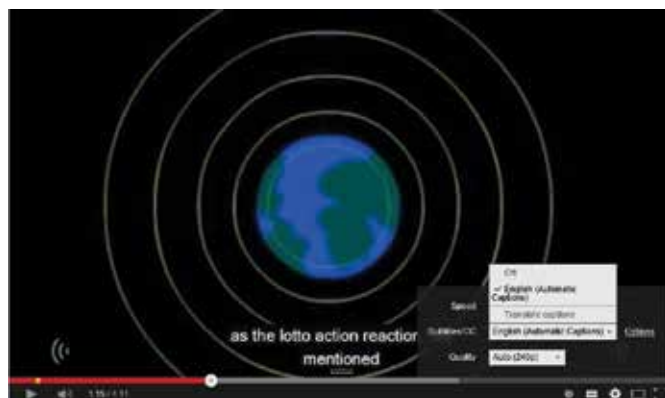


Figure 5. Subtitling in the Original Language Only from a Video Titled “New Gravity Understanding” (source: <https://www.youtube.com/watch?v=1hPXivsrqnk>).



Figure 6. Subtitling with the Option to Get Translations from a Video Titled “Fracking Explained” (source: <http://www.youtube.com/watch?v=Uti2niW2BRA>).

unpopular and average videos merely gave the viewer the choice between switching native subtitling on or off. The difference is statistically significant, respectively $\chi^2(1, N=48) = 18.7, p < 0.001$, and $\chi^2(1, N=39) = 16.0, p < 0.001$. Unpopular and average videos did not significantly differ from one another.

Physical Characteristics: Verbal & Sound –

Audio. The term audio refers to what viewers can hear. A distinction is made between four types of auditory information: Narration, music, sound and noise. All the sampled videos included audio information; there were no completely silent videos.

The subcategory *narration* refers to the spoken words in a video. Nearly all the talk in the videos came from real people. We found only three instances where the talk seemed to have been computer-generated. Several researchers argue that a real human voice is preferable because of greater naturalness and attractiveness (e.g., Baylor, 2011; Mayer, 2005; van der Meij & van der Meij, 2013).

Just as for pictures, it is possible to distinguish between a functional and ‘decorative’ narrative. The first refers to talk that explains the topic. An example of a functional narrative is the text “hormones keep your heart beating and your body heated” in a video discussing the influence of hormones on the human brain. That same video also included instances of decorative talk. For instance, when the narrator stated “Being a teenager is hard and so is living with one, I’m told.”

Eighty-eight percent of the videos contained a narration (see Table 4). Comparisons between the three popularity classes revealed the presence of a significant difference, $\chi^2(2, N=75) = 9.0, p = 0.011$. Narration is significantly less frequently employed in unpopular videos, $\chi^2(1, N=50) = 5.3, p = 0.021$.

The subcategory *music* refers to all kinds of songs, instrumental works and the like in which rhythm, harmony and melody plays a role. In most of the videos with music, it plays in the background. An example of functional usage of such background music supporting the content was the national anthem of the United Kingdom playing in a video on that country. Likewise, a video on why things are creepy used eerie music to create the right atmosphere for understanding what creepy means. More generally, a good choice of music can contribute to the flow of a video and support the kind of emotion that a video might want to evoke (compare Kämpfe, Sedlmeier, & Renkewitz, 2010).

Music is found in 61 percent of the videos. Comparisons between the three popularity classes revealed the presence of a significant difference, $\chi^2(2, N=75) = 8.5, p = 0.014$. Average videos used music the least often (40%), next are unpopular videos (64%). Music commonly appears in popular videos (80%). Only the difference between popular and average videos was statistically significant, $\chi^2(1, N=50) = 8.3, p = 0.004$.

A clear distinction could be made between videos in which music was played only in the opening and at closure and videos where music was (almost) consistently present. On average about one-third of the music appeared at the beginning and/or end of the videos. The majority (67%) played music throughout the video. In all three popularity classes, almost the same 33-67 ratio was found.

In about thirty percent of all videos, narration and music were jointly presented. In most cases, the music played a background role and should not compete with the spoken message. To avoid such competition, it is advised not to use vocals and piano melodies, among others (“Choosing music for your video,” 2015). As far as we have been able to establish, the music in most videos did not draw the viewer’s attention away from the narrative.

The subcategory *sounds* refers to audio elements used to create a special sound effect as one might also find in plays (for example, flowing water, or the creaking sound of an opening door). The sounds that we found appeared to be used mainly to achieve a signaling or supportive function. That is, they tended to be used for drawing attention to a change on the screen. The viewer might hear a swoosh sound for a change of pictures in the video, or a “bleep” or ‘pling’ would accompany the emergent display of a label with a picture.

The use of sounds in the videos is unusual. On average, twenty-one percent of the videos used a sound effect. There were no differences between popularity classes.

The subcategory *noise* refers to undesirable mechanical sounds that happen to have been recorded. An example is the presence of a static buzzing or ambient sound presumably stemming from the microphone, in a video narration on Bernoulli’s principle. On average, the audio in twenty-four percent of the videos was slightly noisy to noisy. Comparisons between the three popularity classes revealed the presence of a significant difference, $\chi^2(2, N=73) = 8.1, p = 0.017$. Noise is rare in popular videos and more common in unpopular videos, $\chi^2(1, N=48) = 6.7, p = 0.010$, and average videos $\chi^2(1, N=49) = 7.6, p = 0.006$.

YouTube's More Popular Instructional Videos

Physical Characteristics: Tempo

The category tempo includes two characteristics that affect the speed of the video. One aspect is narrative speed. Simply put this is the pace of the talk by the presenter or narrator. The dynamics of the pictures in an instructional video should be aligned with this tempo (Plaisant & Shneiderman, 2005; van der Meij & van der Meij, 2013). That is, in normal playing mode the narrative speed should dictate the speed for presenting the visual information. In the present study, we operationalized the narrative speed as the number of words per minute (wpm-rating). For the word count, we turned to the YouTube transcripts, which provided a sufficiently accurate estimate for computing the wpm-rating.

For *narrative speed*, a mean score of 145 words per minute with a standard deviation of 40 was found for all videos together. This outcome is similar to what was reported in a recent empirical study involving the analysis of 6.9 million video watching sessions in four EdEx courses (Guo et al., 2014). That study found a mean speaking rate of 156 wpm and a standard deviation of 31.

Advice on the recommended narrative speed varies considerably (e.g., Drew, 2015; "How to write," 2015; "Make a good video script," 2015). At the lower end, a figure is mentioned between 125-150 words per minute. The boundary between the lower and middle range is also described as "The typical rule of thumb in the industry is 150 words per minute" ("9 Insider tips," 2015). The middle range is for 150 - 175 words. Narratives with a faster speaking rate constitute the upper range. This includes the figure 180 words per minute, which is considered "a common estimate for broadcasting" ("Timing for a broadcast script," 2015). The aforementioned empirical study of Guo, Kim and Rubin (2014) found that students engaged more with videos where instructors spoke faster. More specifically, when presenters spoke with a rate of 185 words per minute or more, viewer engagement was found to increase significantly. The authors also found no evidence of more play and pause events in faster videos, which led them to the conclusion that these videos were not more confusing and harder to follow.

A comparison for the three popularity classes on narrative speed yielded a significant result, $\chi^2(2, N=63) = 16.41, p < 0.001$. The difference lies in the contrast between the popular videos with the two other popularity classes. The narrative speed in popular videos is substantially higher.

The difference in narrative speed of the popularity classes also shows up when we look at videos that lie below or above 1 standard deviation from the mean (that is, lower than 105, or higher than 185). For unpopular videos such limits do not matter; all fall within this range. Fifteen of the sixteen videos with a wpm-rating fell below the mean score 145. For average videos, six out of twenty-three videos scored below the minimum wpm-rating, as opposed to a single instance of a video scoring beyond the mean range. In contrast, for popular videos none scored below the mean range. Exactly fifty percent ($n=12$) had a narrative speed beyond that range. This signals that popular videos not only average a higher narrative speed, but also that this is a common characteristic of a substantial proportion of these videos.

The other temporal feature is the inclusion of *natural pauses*. During such pauses nothing visibly or audibly happens in the video. There is no talk and the visuals remain unchanged. Research suggests that such pauses help demarcate event boundaries and give the viewer time to reflect and let sink in the just-completed segment (e.g., Ertelt, 2007; Spanjers, van Gog, & van Merriënboer, 2010, 2012). Even pauses that last no longer than 2 to 5 seconds can contribute significantly to knowledge development.

On average, 70% of all videos included natural pauses on a regular basis. A significant negative correlation with speaking rate was found (Kendall's tau ($N=63$) = -0.42, $p < 0.001$). In other words, where there is a higher speaking rate, there are fewer natural pauses.

A comparison for the three popularity classes yielded a significant result, $\chi^2(2, N=67) = 14.54, p = 0.001$. The difference lies in the contrast between the popular videos with the two other popularity classes. The presence of natural pauses is just over twice as frequent in unpopular and average videos. Unfortunately, as noted in the Method section, coding natural pauses did not reach satisfactory agreement between raters that merit drawing firm conclusions for this feature.

Conclusion

The formula that we constructed for assessing the popularity of YouTube videos served its purpose well. It helped create a meaningful distinction between three popularity classes, using a combination of data from viewer appreciation and viewing rate. The highly diverse

frequency data for the main variables in the formula suggest that this is not self-evident.

When we started coding the videos, we had not expected to discover that popular videos would do so well on nearly all physical characteristics that we analyzed. But they did. As we progressed in our analyses, it also became increasingly apparent that what seemed like a straightforward inventory study, turned out to be a quest for meaning that is far from being rounded off.

For several measures that we looked at, questions about meaning emerged. For instance, we have yet to discover how YouTube exactly measures views. Is it, as some claim, enough that people upload a video and keep it opened up for a minimum of five seconds? Or is the view count a more complex measure, and perhaps even changing over time as data mining techniques advance? Questions about measurements also concern functionality. This issue was already raised in the presentation of the results where we made a distinction between pictures playing a functional or decorative role.

These questions aside, we believe that our study yields fruitful insights on what makes an instructional YouTube video popular. Hopefully, it also provides a good starting point for further research on what turns a popular instructional video into an effective one.

References

- 9 Insider tips for creating a killer explainer video. (2015). Retrieved February 2, 2015, from <https://blog.kissmetrics.com/creating-a-explainer-video/>
- Anderson, L. W., Krathwohl, D. R., Airasian, P. W., Cruikshank, K. A., Mayer, R. E., Pintrich, P. R., . . . Wittrock, M. C. (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. New York, NY: Pearson, Allyn & Bacon.
- Arguel, A., & Jamet, E. (2009). Using video and static pictures to improve learning of procedural contents. *Computers in Human Behavior*, 25, 354-359. doi: 10.1016/j.chb.2008.12.014
- Baylor, A. L. (2011). The design of motivational agents and avatars. *Educational Technology Research & Development*, 59, 291-300. doi: 10.1007/s11423-011-9196-3
- Choosing music for your video. (2015). Retrieved February 7, 2015, from <http://wistia.com/learning/choosing-music-for-your-video>
- Drew, P. (2015). Copywriting for instructional design narration and role playing Retrieved February 2, 2015, from <http://www.e-learningvoices.com/articles/copywriting.php>
- Ertelt, A. (2007). *On-screen videos as an effective learning tool. The effect of instructional design variants and practice on learning achievements, retention, transfer, and motivation*. (Doctoral dissertation), Albert-Ludwigs Universität Freiburg, Germany.
- Guo, P. J., Kim, J., & Rubin, R. (2014, March 4-5). *How video production affects student engagement: An empirical study of MOOC videos*. Paper presented at the The first ACM conference on Learning @ scale conference (L@S '14), Atlanta, GA.
- Here's why the view count on new YouTube videos always stops at 301. (2014). Retrieved February 4, 2015, from <http://businessetc.thejournal.ie/why-youtube-views-stop-301-1606621-Aug2014/>
- Höffler, T. N., & Leutner, D. (2007). Instructional animation versus static pictures: A meta-analysis. *Learning and Instruction*, 17, 722-738. doi: 10.1016/j.learninstruc.2007.09.013
- How to write a killer explainer video script. (2015). Retrieved February 2, 2015, from <http://www.videobrewery.com/blog/how-to-write-a-killer-explainer-video-script>
- Kämpfe, J., Sedlmeier, P., & Renkewitz, F. (2010). The impact of background music on adult listeners: A meta-analysis. *Psychology of Music*, 39(4), 424-448. doi: 10.1177/0305735610376261
- Make a good video script great in 5 steps. (2015). Retrieved February 2, 2015, from <http://www.sitepoint.com/make-a-good-video-script-great-in-5-steps/>
- Mayer, R. E. (2005). Principles of multimedia learning on social cues: Personalization, voice and image principles. In R. E. Mayer (Ed.), *The Cambridge handbook of multimedia learning* (pp. 201-212). New York, NY: Cambridge University Press.
- Morain, M., & Swarts, J. (2012). YouTutorial: A framework for assessing instructional online video. *Technical Communication Quarterly*, 21, 6-24. doi: 10.1080/10572252.2012.626690
- Plaisant, C., & Shneiderman, B. (2005). *Show me! Guidelines for recorded demonstration*. Paper presented at the 2005 IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC'05), Dallas, Texas. <http://www>

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- cs.umd.edu/localphp/hcil/tech-reports-search.php?number=2005-02
- Ploetzner, R., & Lowe, R. (2012). A systematic characterisation of expository animations. *Computers in Human Behavior*, 28, 781-794. doi: 10.1016/j.chb.2011.12.001
- Smith, P. L., & Ragan, T. J. (2005). *Instructional design* (3rd ed.). Hoboken, NJ: Wiley
- Spanjers, I. A. E., van Gog, T., & van Merriënboer, J. J. G. (2010). A theoretical analysis of how segmentation of dynamic visualizations optimizes students' learning. *Educational Psychology Review*, 22, 411-423. doi: 10.1007/s10648-010-9135-6
- Spanjers, I. A. E., van Gog, T., & van Merriënboer, J. J. G. (2012). Segmentation of worked examples: effects on cognitive load and learning. *Applied Cognitive Psychology*, 26, 352-358. doi: 10.1002/acp.1832
- Statistics. (2015). Retrieved February 8, 2015, from <https://www.youtube.com/yt/press/statistics.html>
- Swarts, J. (2012). New modes of help: Best practices for instructional video. *Technical Communication*, 59(3), 195-206.
- Timing for a broadcast script. (2015). Retrieved February 2, 2015, from <https://jtoolkit.wordpress.com/2008/04/12/timing-for-a-broadcast-script/>
- Tversky, B., Bauer-Morrison, J., & Bétrancourt, M. (2002). Animation: Can it facilitate? *International Journal of Human-Computer Studies*, 57, 247-262. doi: 10.1006/ijhc.2002.1017
- van der Meij, H., & van der Meij, J. (2013). Eight guidelines for the design of instructional videos for software training. *Technical Communication*, 60(3), 205-228.
- Wistia. (2012). Does length matter? Retrieved from <http://wistia.com/blog/does-length-matter-it-does-for-video-2k12-edition>

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Manuscript received 9 February 2015; revised 20 February 2015; accepted 20 February 2015.

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100 Years of Swiss Graphic Design

Christian Brändle, Karin Gimmi, Barbara Junod, Christina Reble, Bettina Richter, and Museum für Gestaltung Zürich, eds. 2013. Zurich: Lars Müller Publishers. [ISBN 978-3-03778-399-3. 352 pages, including index. US\$70.00.]



100 Years of Swiss Graphic Design, a new, comprehensive reference work presents a fresh perspective on a wide area of Swiss graphic design and typography over the past 100 years and offers a behind-the-scenes look at the renowned collections of graphic design of the Museum für Gestaltung Zürich. Switzerland's leading design and visual communication

museum, it boasts one of the most substantial poster collections in the world. The book traces the origins of Swiss graphic design and typography, while offering a wide range of contemporary Swiss visual communication examples. It is a rich source of familiar Swiss classics and unseen material, including sketches, handmade layouts, packaging, stamps, logbooks, maps, traffic signs, banknotes, visual information and design system manuals, photographs, and type specimens.

The book has eleven chapters that are sequenced thematically into important Swiss design developments and common uses of visual communication. Many chapters begin with a short essay that helps frame and place the topic in the historical conditions that existed in the specific time followed by explanatory case studies. Each case study adds new layers of depth by exploring the trends that brought new forms of design into existence. The dynamic tradition and evolution of Swiss graphic design and the exploration of aesthetic movements, patterns, and historical currents over the past century emerge by connecting the themes on a temporal structure.

The one criticism concerns the weight of emphasis on individual Swiss graphic designers. The selection process becomes more difficult taking into account Switzerland's Modernist graphic design traditions and the abundance of outstanding designers spanning different eras. To point out a few examples, Ernst Keller, considered an instrumental Swiss design educator and key figure in the development of the Swiss design movement, is mentioned only sparingly. In addition,

Siegfried Odermatt and Rosmarie Tissi have been given limited analysis in the text and only granted three images between them. Odermatt and Tissi played a chief role in applying the International Typographic Style to corporate and cultural visual communications and deserved more attention.

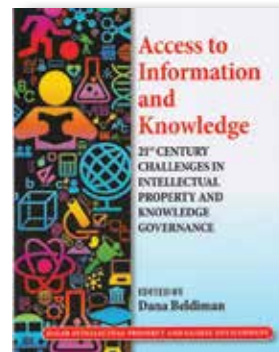
Overall, *100 Years of Swiss Graphic Design* is an engaging and comprehensive historical survey, accompanied by numerous examples of Switzerland's vast body of design work. Highlighting visual design across a wide range of niche areas of expertise over a century, this invaluable book demonstrates how a majority of the Swiss designers' modernist elements and constructivist ideals continue to exist as an all-important part of today's graphic language. It is essential reading for design students or specialized professionals interested in Swiss typography. It is a salient contribution to the development of graphic design history as a scholarly discipline and comprehensive account of a period of significant artistic creativity.

Richard Doubleday

Richard B. Doubleday is an assistant professor in the Department of Graphic Design at Louisiana State University's School of Art. He is a contributing author for Phaidon Archive of Graphic Design and Meggs' History of Graphic Design. Richard has been published in *Baseline*, *IDEA*, *Print*, *NOVUM*, *Zhuangshi*, and *Australian Creative*.

Access to Information and Knowledge: 21st Century Challenges in Intellectual Property and Knowledge Governance

Dana Beldiman, ed. 2013. Cheltenham, UK: Edward Elgar Publishing. [ISBN 978-1-78347-047-1. 318 pages, including index. US\$130.00.]



Intellectual property (IP) rights legislation has been around for a long time. For objects, patent laws have been around since the early 14th century. For works of literary and artistic merit, initial legislation for copyright first appeared in 1790; then came international legislation such

as the Bern Convention of 1886 and the Chace Act in the United States in 1891. That legislation was meant to stamp out pirated editions of British literary works. But what about scientific data, especially data that are produced as a result of public sector funding?

Significant problems arise in the current environment in which we find knowledge products to be a key economic resource. International handling of data in such an environment poses many legal problems. The Center for Transnational IP, Media and Technology Law and Policy was established in May of 2012 in Hamburg, Germany. Beldiman's *Access to Information and Knowledge: 21st Century Challenges in Intellectual Property and Knowledge Governance* is the first publication from the Center. It collects 11 essays divided into four sections. Following an introduction, Part One assesses access to information in the public sector and in scientific research; Part Two addresses conceptual contours of international property laws; Part Three discusses new stakeholders; and Part Four looks at access in the international arena to intellectual property.

The value of these essays lies in their discussions of the international implications for those wishing to use intellectual property developed in the public sector. The introduction and first chapter point out a serious conflict between intellectual property laws and technology. Both argue for the need to revisit intellectual property laws to understand how they contribute to or prevent the free flow of information. The second and third chapters present different models used in scientific research that involve open access to data and the role of intellectual property protection.

Other chapters cover law and abstract inventions, the political implications of intellectual property issues, the problems that arise with agreements on trade-related aspects as they apply to intellectual property rights, the development of often secret treaties among developing nations to control the free flow of information and, finally, the failure to harmonize the various penalties involved with violating intellectual property rights.

The collection of essays becomes not only an explication of the issues but also a sourcebook for those whose products require the intellectual property.

Technical communicators wishing to understand the complexities of intellectual property laws across political boundaries will find this collection of essays

valuable. But be aware that the essays are scholarly with all the scholarly apparatus as well as being meant for those with specific interest in international intellectual property law. Certainly, this collection deserves a place in the company library for those companies who use intellectual property, but also those interested in international IP law.

Tom Warren

Tom Warren is an STC Fellow, Jay R. Gould Award for Excellence recipient, and professor emeritus of English (technical writing) at Oklahoma State University, where he established the BA, MA, and PhD technical writing programs. Past president of INTECOM, he serves as guest professor at the University of Paderborn, Germany.

Personal Archiving: Preserving Our Digital Heritage

Donald T. Hawkins, ed. 2013. Medford, NJ: Information Today, Inc. [ISBN 978-1-57387-480-9. 300 pages, including index. US\$49.50 (softcover).]



As technical communicators, we know the need for archiving documentation. As human beings, we also understand the value of archiving personal or family mementos for the next or future generations. But, have we considered the consequences of not actively managing our own email, social media posts, and digital photo albums that may

hold future value? This is the highly relevant topic that *Personal Archiving: Preserving Our Digital Heritage* addresses. The book resulted from a collaboration of the 2011 and 2012 Personal Archiving Conferences attendees organized by Jeff Ubois (MacArthur Foundation).

Hawkins introduces the archiving dilemmas of why, how, what, who, and when. Chapters 1–3 cover personal archiving of digital files as considered by Jeff Ubois and two other employees of archival institutions: Cotton Gloves Research and Library of Congress. The bare basics suggested are locate, scan, store, and back up in a manner and location from which information is

accessible. Technical writers know this, but how faithful is our personal practice?

In Chapters 4 and 11, Hawkins and Richard Banks (Microsoft Research) present overviews of technologies that attempt to address personal archiving, especially photos. What started with online libraries, loosely known as the cloud, is now becoming home software and hardware solutions. Grandma's shoebox of photos is the metaphor used by www.1000memories.com, and tabletop digital slide viewers abound, one aptly named, Shoebox.

In Chapter 5, Evan Carrol tackles the legal and practical issues of digital inheritance when triggered by an event. He discusses an employee leaving (maintain important files) and after a relative is deceased (provide privacy while preserving memories). Copyright laws and legally binding contracts with social media are some obstacles to consider during one's lifetime. Chuck Palahniuk challenges in his *Diary*: "The goal isn't to live forever; the goal is to create something that will" (p. 83).

As a freelance research writer, you will appreciate the topic in Chapter 7, how to use narrative elements for digital research. Ben Shneiderman, author of *Leonardo's Laptop*, allowed an archival team lead by Jason Zalinger (University of South Florida) to search his email from 1984–1998. Successful strategies they developed and documented for searching nearly 45,000 files may be worth the cost of *Personal Archiving*.

In Chapters 9, 10 and 12, Hawkins and collaborators from University of Texas and Internet Archive, examine the best of the present and predict new horizons. Trends include 1 Second Everyday of personal video (What would you pay for a video of your great-grandparents?) and MUSE for handling emails.

Clifford Lynch (Coalition for Networked Information) ends the book mentioning the need for uniform archival of personal medical information. Perhaps we weren't considering that detail of our lives being archived, but someone is.

Reading *Personal Archiving* may just lead you to consider new career opportunities for archivists!

Donna Ford

Donna Ford has been a member of STC, joining in 1990 and serving on her local chapter's board for many years. She has been a technical writer since 1987 in the hardware, software and government health care industries. She holds a certificate in information design from Bentley College.

84 Tips: New Instructional Design for New Instructional Technology

The eLearning Guild. 2014. Santa Rosa, CA: The eLearning Guild. [34 pages. Free Download: http://www.elearningguild.com/publications/index.cfm?id=44&utm_campaign=ebookol116&utm_medium=email&utm_source=elrnindli]



When designing learning solutions, do you ever feel internal or external pressure to turn to the hottest technology? In this free eBook produced by The eLearning Guild (www.elearningguild.com), 21 learning professionals offer their advice for integrating new instructional technologies with instructional design.

Overall, I appreciate how the tips are organized in the order by which they fall in the design development process. For instance, the first section covers placing learner goals before technology. The next couple of sections deal with the planning and management of new instructional technology, as well as developing with and blending different technologies. The last few chapters cover specific concepts including language learning, gamification, graphic novels, mobile learning, and massive open online courses (MOOCs). The final section unifies everything by covering the sharing of learning technology knowledge and expertise.

While almost all the tips in *84 Tips: New Instructional Design for New Instructional Technology* proved beneficial, a few examples stand out. For instance, Carolyn Stoll and Dawn Clineman both use the analogy of a one-room schoolhouse in describing the concept of individualized learning and the instructor's role in helping students take greater responsibility for their learning (p. 7). In the "Developing with and Blending Instructional Technologies" section, Joe Totherow gives excellent and detailed instructions in using "basic [Adobe] Captivate tools to make meaningful interactions" (p. 12) in which users can locate a function on their own or request additional help. Later, in the "Learning Games and Gamification" section, Totherow uses a timed game example in explaining how game mechanics should be part of the instructional objective and not just a fancy addition (pp. 23-24).

84 Tips contains a good variety of general and tool-specific tips. Even the tool-specific tips contain nuggets of wisdom applicable to other technologies.

This eBook contained two minor drawbacks. First, a few tips were formatted more as essays rather than as single tips. For example, Jason Fararooci's tip discussing the use of filmic video in training and communications (pp. 15-16) could easily have been broken into separate tips covering such topics as the role of the producer/director and maximizing video investment. Although such tips contained a wealth of information, they could have benefitted from being separated into smaller nuggets to help readers retain more of the information.

Second, several sections in *84 Tips*, including, but not limited to "Three Tips for Sharing Learning Technology," contained entries from only one author. Although the tips themselves contained valuable information, having at least one additional contributor would have provided additional and different perspectives on the topic.

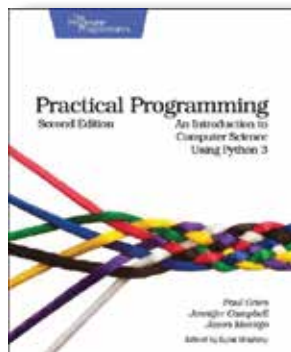
Despite these minor drawbacks, *84 Tips* remains a valuable resource to learn more about integrating technology into instructional design. As Chris Benz states in the introduction, "we must use effective instructional design. Otherwise, the results of our work might be cool and awesome, but ineffective for meeting learning goals and needs" (p. 1).

Jamye Sagan

Jamye Sagan has over 10 years of technical communication experience. She is the pharmacy communications advisor for H-E-B Grocery Company in San Antonio, TX. A Senior member, Jamye is active with the Instructional Design & Learning SIG, where she has contributed several Summit session reviews for the SIG's newsletter.

Practical Programming: An Introduction to Computer Science Using Python 3

Paul Gries, Jennifer Campbell, and Jason Montojo. 2013. 2nd ed. Raleigh, NC: Pragmatic Bookshelf. [ISBN 978-1-93778-545-1. 382 pages, including index. US\$38.00 (softcover).]



Practical Programming: An Introduction to Computer Science Using Python 3 introduces readers with little or no coding experience to basic programming principles. Overall, the book's step-by-step structure and hands-on exercises make it a great starting point for a technical writer interested in

learning to code. You may not write a complex program overnight, but you'll understand the building blocks that underlie well-written code, which can help you work better with programmers or serve as a springboard for further study.

The book's exercises include instructions and links for downloading the language. An early chapter, "Hello, Python," demonstrates how a computer executes a program and explains some simple building blocks: types, operators, and variables. A lengthy chapter is dedicated to functions (commands that carry out a calculation on a variable and return a result) and includes a detailed example and basic formula for creating your own functions. Later chapters discuss working with text, lists, and dictionaries to store and retrieve data. In the final chapters, you learn about testing your code and designing user interfaces. Each chapter builds on the previous one, so skipping around is not recommended.

Each chapter includes a basic introduction, a step-by-step scenario using the element under discussion (including errors you might encounter), a recap of the main points, and further exercises for practice (answers are on the book's Web site). The authors encourage you to type each piece of code to see the results on your own monitor. This structure successfully illustrates how each code element works. However, errors are sometimes built into the steps so that you can see how they happen. It can be discouraging to see an error onscreen before you turn the page to realize you were "supposed" to get an error if you followed the directions.

Another drawback of the book's organization is the lack of basic information about saving and accessing your program files early on. One chapter asked me to save a function in one file and then import that function into another open program file, but the instructions were not explicit enough. I encountered several errors until I asked a programmer for help. Afterwards, I discovered the directions I needed in Chapter 10.

Besides Python-specific information, the authors include principles for writing efficient code in any programming language. Specific recommendations include importing ready-made functions rather than writing your own, using loops to repeat instructions more efficiently, and using unit tests to isolate bugs.

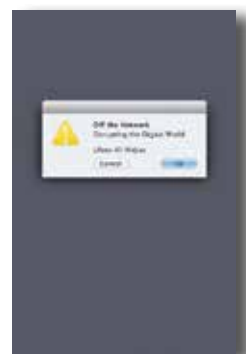
I recommend *Practical Programming* to technical communicators who want to learn Python and its programming principles. The book's structure lets you learn one element before moving on to the next, and the examples are easy to follow. The book is well written, despite its minor organizational issues, and allows for a hands-on learning experience to help you experience the world of programming.

Bonnie J. Shamp Winstel

Bonnie J. Shamp Winstel is a technical writer for a small software company in Huntsville, Alabama. She received her master's degree in English and Technical Communication at the University of Alabama-Huntsville in May 2013 and is a new TC Professional member of STC.

Off the Network: Disrupting the Digital World

Ulises Ali Mejias. 2013. Minneapolis, MN: University of Minnesota Press. [ISBN 978-0-8166-7900-3. 198 pages, including index. US\$22.50 (softcover).]



Since the beginning of the 21st century, our world has become a digital world. In *Off the Network*, Mejias points out that it took over 70 years for the telephone to reach half the homes in the United States. However, it only took 10 years for the Internet to reach the same portion of households. Digital networks are used for profit, control, and even surveillance.

Using the digital network to connect with friends through Facebook, distinguishing between the real world and the virtual world becomes difficult. As participation in Facebook and networks has grown, so has the surveillance. There are new methods of data mining and monitoring.

Mejias explores the hidden aspects of the digital network and uncovers areas of network use that should worry us. For example, he explained that the college at the State University of New York (SUNY) where he works decided to accept Google's offer to handle all of the school's e-mail for free. Since SUNY was faced with a multi-million dollar budget cut from the state, they decided to accept the offer. Google promised them a full menu of applications, file storage, chat, and 2.5GB of storage. However, Mejias was concerned when he noticed some other universities were turning down a similar Google offer. He questioned whether Google would be obligated to hand over the SUNY e-mail if authorities in countries where the e-mail copies were stored would ask for them.

Mejias warns that with the digital world being so convenient with mobile applications, newspapers, and magazines that we can carry with us on our electronic devices, we are surrendering our privacy for the convenience. Our location can even be monitored if we carry a cell phone. Authorities can use one's phone to track the person and report their location.

The networks are exposed to threats, such as identity theft and service disruption.

Some benefits exist despite the negative aspects of digital networks. For example, an employee in India can work with coworkers in New York. So, the geographic location is no longer a barrier. Also, one can use the network to learn what is going on in the local area and keep track of close connections. Staying connected to people locally helps one meet others that one would not meet otherwise without the digital network.

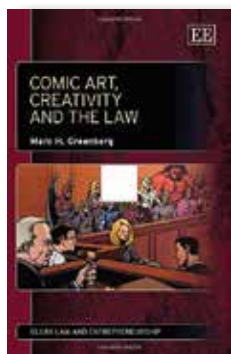
Mejias explores different areas where digital networks are changing the way we live. Although interesting and insightful, Mejias' book is a difficult read (having sampled several segments and found an average Gunning Fog index of 19), but it contains interesting views regarding our digital networked society.

Rhonda Lunemann

Rhonda Lunemann is a technical writer with Siemens PLM Software, a senior member of STC's Twin Cities Chapter, and a member and officer of the Hill Speakers Toastmasters Club (Club 4415).

Comic Art, Creativity and the Law

Marc H. Greenberg. 2014. North Hampton, MA: Edward Elgar Publishing Limited. [ISBN 978 1 78195 492 8. 208 pages, including index. US\$110.00.]



Mark Greenberg's *Comic Art, Creativity and the Law* outlines the protective, and often restrictive, aspects of the relationship between the law and the comic book industry. Beginning with a brief history of the genre, Greenberg defines the comics medium and charts the comics industry's history. Since the genre's beginning as a newspaper feature,

the comics industry has seen its share of legal conflict. Perhaps the earliest and most famous legal dispute over ownership of an artist's work is the case of Jerry Siegel and Joel Schuster, who were paid a grand total of \$130 for their original *Superman* comic book. DC used the work-for-hire doctrine in its defense, a defense also used in disputes with other creators that Greenberg examines in his book.

Given the legal aspect of its subject matter, one might expect *Comic Art, Creativity and the Law* to be a rather dry tome on the history of case law and its regulation of comics. Greenberg's text rather is a very accessible, even enjoyable read. The book offers a fair assessment of how the law affects the creative process. The background information of the book's early chapters—wherein Greenberg establishes the parameters of his subject—might seem a bit tedious to readers already familiar with comics. However, establishing background information is necessary to create a context for Greenberg's discussion. Despite its nerdy subject matter, *Comic Art, Creativity and the Law* explains the potential legal pitfalls that face all working artists regardless of genre.

Nevertheless, from a technical writing standpoint, the information this work contains is at best tangential. Greenberg dedicates space to the work-for-hire doctrine discussion that affected so many early writers working in the comics industry. This information is of interest to writers, particularly those creating comic book-style technical manuals. Comic book-style manuals differ from entertainment comics in scope and subject matter, and their writers are paid differently than the creators of entertainment comics. Additionally, Greenberg discusses

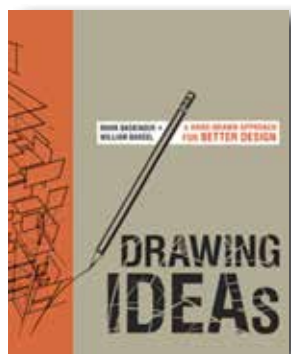
obscenity law at some length. While this information is interesting, it is not usually a matter of concern for technical communicators. Furthermore, Greenberg addresses legal issues faced by consumers and comic book distributors. Given that technical communicators' contact with their audience is almost non-existent, and their clients must approve the documents before release to the public, obscenity law does not affect them. While *Comic Art, Creativity and the Law* is fascinating, even compelling, its principle audience is entertainment comic book creators, attorneys, and fans.

Allen Berry

Allen Berry is a college English teacher, teaching business writing, composition, and literature, and an avid fan of comics. He has published both critical and creative works. He is a member of AWP and the author of a collection of poetry entitled *Travel for Agoraphobics*. He currently teaches business writing as an adjunct professor at the University of Alabama Huntsville.

Drawing Ideas: A Hand-Drawn Approach for Better Design

Mark Baskinger and William Bardel. 2013. New York, NY: Watson-Guption Publications. [ISBN 978-0-385-34462-3. 304 pages, including index. US\$40.00.]



Drawing Ideas: a Hand-Drawn Approach for Better Design is a treasure. The primary audience is those who want to learn to draw or improve their drawing skills. The second audience is those who specify drawings or content that's presented visually. This audience will gain an understanding for

the drawing process so specifications and expectations are clear and a project can run more smoothly. Although illustrators seem to draw effortlessly, *Drawing Ideas* shows why their work can be very time-consuming.

Baskinger and Bardel divide the book into five sections, from drawing by individuals through drawing to tell a story. For me, it worked to start at the beginning since it builds from parts to wholes and then for me to use it as a reference.

The first two chapters show how to draw and sketch. This includes basics like how to hold a pencil, ways to draw the human form, and technical ways to render.

These two chapters include formats that the next three chapters also use. Blue double-page spreads, “Demonstrations,” show various ways to create drawings and graphics. Another type of double-page spread in the chapters is “Top 10,” which includes tips for effective seeing and good sketching.

Chapter 3, “Drawing to Clarify Your Own Thinking,” covers different types of sketches to suit different situations for the illustrator.

Now that you’ve mastered, or at least recognized, the basics of drawing, Baskinger and Bardel switch to putting this to use in drawing for others in the final two chapters.

Chapter 4, “Drawing to Explain Your Ideas to Others,” emphasizes its importance by being the longest chapter and taking up nearly one-third of the book. The authors walk you through the steps of planning your sketches and choosing a graphic structure. These include diagrammatic maps and twenty-one other formats. They then show how to compose a visual layout, and then how to incorporate details. The Workshop at the end of Chapter 4 is on team drawing, useful in any business situation.

Chapter 5, “Drawing to Tell a Visual Story,” is what it says: How to plan and draw narratives and even gives a glimpse into comics.

Profusely illustrated with multiple, carefully chosen small examples for each spread, the reader can see a range of options for pencil drawing.

There are no end-of-chapter exercises, a good feature. Baskinger and Bardel respect your intelligence and assume that you’ll know when to assign work if you use this as a text. If *Drawing Ideas* is strictly for your edification and professional growth, you’re not distracted by exercises designed for textbooks.

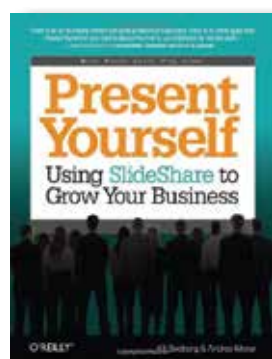
The large book is almost coffee-table size while the weight and texture of the paper give it a feel of permanence as a reference book. The skimpy index is the only downside to this book.

Beth Lisberg Najberg

Beth Lisberg Najberg has more than 25 years’ experience as an information and instructional design consultant, documenting systems, developing custom training solutions, and creating technical presentations for large corporations and public entities. She is principal of Beginnings (www.Beginnings-Design.com), an information design consulting firm.

Present Yourself: Using SlideShare to Grow Your Business

Kit Seeborg and Andrea Meyer. 2013. Sebastopol, CA: O’Reilly. [ISBN 978-1-449-34236-4. 202 pages, including index. US\$24.99 (softcover).]



SlideShare (www.SlideShare.net) is an online content sharing platform that lets users upload their slide decks—PowerPoint or Keynote presentations. Once uploaded, these slide decks can be designated as private (only accessible to a select group of users), or public (viewable by anyone).

You can also use the platform for other file formats, such as media files or PDFs.

The first two chapters of Kit Seeborg and Andrea Meyer’s *Present Yourself: Using SlideShare to Grow Your Business* explain the basics of setting up a SlideShare account and the different account levels (from a free basic account through a Platinum company account). The rest of the book is dedicated to the various ways in which you can use the uploaded SlideShare presentation.

Much of that advice can be used more generally, but the authors also show how SlideShare fits into these marketing, research, and communication activities. The section on incorporating slides into agile development in the Research and Collaboration chapter, for example, not only explains the agile process, but also shows how using online slide decks to share visual representations of various ideas with a team may improve that process. The authors emphasize integration of SlideShare with other social media tools, such as LinkedIn or blogs, and provide ideas on how to best use your slideshow in that context.

A number of first-person accounts illustrate how SlideShare users actually implemented that platform in their company’s activities. The final chapter explores how different “special cases,” such as start-ups, non-profits or governmental bodies, might benefit from SlideShare.

If you are new to marketing, you may want to pick up this book instead of another marketing guide, since it also includes information on topics such as the different types of conferences at which you might speak or where to find inspiration for that content you are creating.

If you are a seasoned marketing professional, you probably want to read the portion about actually setting

up SlideShare and the bulleted summaries at the end of each chapter for ideas on how to use your PowerPoint/Keynote presentations. This then lets you target only the sections that are relevant to your specific marketing plan.

Barbara Jungwirth

After writing software documentation and managing an IT department, Barbara Jungwirth now translates German technical documents into polished English appropriate for a specific audience. She owns reliable translations llc (www.reliable-translations.com); writes a blog, On Language and Translation (www.reliable-translations.com/blog/); and tweets (@reliabletran). You can also connect with her on LinkedIn (www.linkedin.com/in/BarbaraJungwirth).

The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies

Erik Brynjolfsson and Andrew McAfee. 2014. New York, NY: Norton. [ISBN 978-0-393-23935-5. 304 pages, including index. US\$26.95.]



In the first machine age, the steam engine replaced the muscle power of humans and horses, and set off a cascade of technological development—railroads, internal combustion, electricity—that profoundly changed the arc of human progress.

In *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*,

Brynjolfsson and McAfee argue that we are in the midst of a similar change in the inflexion of that arc, and are rapidly being launched into a world like nothing we have seen before, a world with incredible benefits, but also with thorny challenges that must be confronted.

Extending on both authors' earlier work in *Race Against the Machine* (2011), they argue that the key building blocks are now in place to transform our society in ways that would have been thought impossible only a few years ago.

For example, it was long held that computers were good at routine tasks like computation, but would never be able to handle complex tasks thought to

be exclusively human like driving an automobile or processing language.

Then, in a very short time—largely through exponential increases in computing power and the confluence of hardware, software, networking, and pattern recognition technologies—computers became good at things that they were once laughingly bad at. The Google driverless car has now logged thousands of freeway driving miles, and computers routinely beat humans at games like chess and Jeopardy. More importantly, computers are now diagnosing disease, doing legal research, doing language translation, and even writing high-quality prose.

Much of *The Second Machine Age* is devoted to discussing two major trends that characterize the second machine age: bounty and spread.

Bounty covers the tendency for digital technologies to produce broad and unprecedented benefits: the world's information becomes easily available, big data improves analysis, and we move into an economy where “abundance is the norm rather than scarcity” (p. 10).

Spread covers the growing gulf between the emerging economy's winners and losers. Once highly valued skills become obsolete and economic models get disrupted, workers and whole professions get replaced by machines, and once thriving activities go out of business. Moreover, digital technologies favor winner-take-all situations where being second best is still not enough to ensure viability.

The authors argue that all this needs to be confronted and that we need to start a serious dialogue.

The last third of the book discusses suggestions for mitigating the effects of spread. These range from preparing people to compete in the new machine age through better teaching and massive online open courses (MOOCs), to supporting start-ups and peer and sharing economies, to revisiting such economic ideas as a guaranteed income and the negative income tax.

Full of meaty examples and cogent argument, *The Second Machine Age* is a must read for anyone serious about understanding a future already upon us.

Patrick Lufkin

Patrick Lufkin is an STC Associate Fellow with experience in computer documentation, newsletter production, and public relations. He reads widely in science, history, and current affairs, as well as on writing and editing. He chairs the Gordon Scholarship for Technical Communication and co-chairs the Northern California Technical Communication competition.

The Flowering of a Tradition: Technical Writing in England, 1641–1700

Elizabeth Tebeaux. 2014. Amityville, NY: Baywood Publishing. [ISBN 978-0-89503-844-9. 275 pages, including index. US\$59.95 (softcover).]



If you search the Internet for books on English literary history or American literature, you will find thousands or more citations. If you do a similar search on technical writing history, you may find 50 or fewer citations. Elizabeth Tebeaux's *The Flowering of a Tradition: Technical Writing in England, 1641–1700*, stands as an important document in tracing the

origins of technical writing. It is a follow-up to her *The Emergence of a Tradition: Technical Writing in the English Renaissance, 1475–1640*.

In nine chapters, Tebeaux develops the argument that in this period, forms and formats are all recognizable as similar to forms and formats that technical communicators produce today. So, both this book and the previous one “should fill a background deficiency of many current English and technical communication majors” (p. v).

In *The Flowering of a Tradition*, Tebeaux covers the industry, trade, and technical writing in this period (Chapter 1); plain style (2); English paragraph (3); format and visual display (4); instructions (5); the evolution of text via orality (6); proposals (7); reports (8); and then she reflects on the emergence of technical writing (9). Her nine chapters may roughly be divided into three groups: First, Chapters 1, 2, and 3 set the scene by exploring Gresham College and the early Royal Society, how the plain style evolved, and the English paragraph. Second, Tebeaux looks at different forms and techniques of technical writing including visuals and writing instructions, proposals, and reports. Third, she concludes with reflections, perspectives, and research recommendations.

Tebeaux's basic argument that the contemporary forms and formats have emerged from the Medieval petition is certainly interesting, and along with her examples, convincing. When most people think of the history of technical writing, they usually think it began before World War II when the weapons systems became

much more complex than those found in World War I. Few think of written appeals to Medieval kings.

Tebeaux includes many examples: both photocopies and transcriptions. Both are useful in making points. However, several of the photocopies are quite difficult to read. For those, a transcription would be most useful.

A much more important issue is the many proofreading errors, especially in Chapter 1. Here a whole paragraph including the heading is repeated as well as it having numerous word and sentence problems. I am concerned because Baywood Publishing has a well-deserved reputation for excellence in the texts they publish in this series. Should they do a second printing or second edition, a more careful proofreading is required. In Chapters 2–9, occasional proofreading errors also occur, but they do not get in the way of smooth reading as is found in Chapter 1.

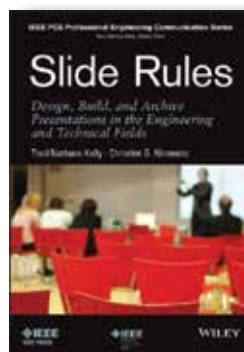
Despite the problems with proofreading and copy editing, *The Flowering of a Tradition* is a valuable addition to technical communication courses and to a technical communicator's personal library.

Tom Warren

Tom Warren is an STC Fellow, Jay R. Gould Award for Excellence recipient, and professor emeritus of English (technical writing) at Oklahoma State University, where he established the BA, MA, and PhD technical writing programs. Past president of INTECOM, he serves as guest professor at the University of Paderborn, Germany.

Slide Rules: Design, Build, and Archive Presentations in the Engineering and Technical Fields

Traci Nathans-Kelly and Christine G. Nicometo. 2014. Hoboken, NJ: Wiley. [ISBN 978-1-118-00296-4. 220 pages, including index. US\$49.95 (softcover).]



What do you do when a presenter displays a PowerPoint slide containing a paragraph of text? You likely start reading and don't hear anything the presenter says. Although slide-based presentations have become the norm from board rooms to professional conferences, presenters often create

unworkable slides that contain too much text, use poor design choices like clashing colors, or display unreadable graphs and figures.

To fix these problems, *Slide Rules: Design, Build, and Archive Presentations in the Engineering and Technical Fields* asks us to apply research from cognitive science to completely change the way we design slide-based presentations. First, the authors discuss the issues with “conventional poor practices,” such as the ubiquitous bullet slide that contains a rather vague and short title (think introduction, agenda, scope, benchmarks). They argue that these slides are often designed as teleprompters for the speaker, yet offer little audience benefit. One better approach they discuss is using “full, complete, and concise sentence headers” (p. 65). Based on research by Michael Alley (author of *The Craft of Scientific Presentations*, another good book), this technique uses an assertion (or claim) in sentence form as the slide title with visual information as evidence supporting the assertion. Alley’s research found that when student presenters followed the assertion–evidence model, they understood the information more than students who followed the typical topic–subtopic model. Moreover, when audiences heard the same talk, the group that saw assertion–evidence slides retained more information than those who saw the typical bullet-filled slides.

Using various research findings, Nathans-Kelly and Nicometo revise “bad” slides and show in full-color better ways to present the same information. They guide readers through building presentations that meet the demands of diverse audiences. The chapter on graphs, for example, deconstructs the data-overload graph and shows how to present complicated and detailed information in chunks that audiences can easily digest. The chapter on templates not only presents the best ways to organize slides (including how to do so when your slides will be translated), but also provides techniques for dealing with bad corporate templates.

While all presenters will benefit from the practices discussed in the first three parts of *Slide Rules*, the last two parts are written for more specific readers. Part 4, for example, has a chapter on archiving slides and another on presenting in multiple languages, while Part 5 contains information about studies that the authors hope readers will use to enact organizational change.

Slide Rules is useful to anyone creating slides (including Prezi) and to instructors who want to teach their students best practices. While the

evidence–assertion method works best for presenting scientific information, this book covers a broad enough territory that even marketing and sales presenters could learn important skills.

Kelly A. Harrison

Kelly A. Harrison, MFA, works as a consultant, speaker, and writing instructor in San José, CA. For over 20 years, she has written print and online content for various high-tech computer companies. Currently, she teaches writing at San José State University and Stanford University.

A Web for Everyone: Designing Accessible User Experiences

Sarah Horton and Whitney Quesenbery. 2014. New York, NY: Rosenfield Media. [ISBN 978-1-933820-97-2. 270 pages, including index. US\$39.00 (softcover).]



A Web for Everyone: Designing Accessible User Experiences discusses accessibility and explains how to make a Web site accessible. Although this book targets Web designers, it is also very useful for programmers, technical communicators, or anyone interested in learning about accessibility. It is very well organized and written in simple

and accessible language, or as the authors would say, in “plain language.” Each chapter refers to a different and interesting topic about accessibility. *A Web for Everyone* starts by giving a broad overview of accessibility to later explain how Web developers should apply it. The book’s design, illustrations, and summaries, offered at the end of each chapter, trigger the readers’ interest in the topic and make the content easy to understand, even for those who don’t have any experience with accessibility.

What makes *A Web for Everyone* a great book is its user-centered approach. At the beginning, Horton and Quesenbery tell us that according to the UN and the World Bank, around 10% of everyone in the world has a disability of some kind and that by the age of retirement, over 30% of the workforce will have some disability. Then, the authors describe unique disabilities that differ from the conventional examples. The book approaches people

with different levels and kinds of literacy, mild cognitive problems, and temporary disabilities, which are actions that temporarily reduce someone's ability to perform a task, such as reading while multi-tasking or unfamiliarity with a topic. Horton and Quesenbery portray real-life data and create personas to help the readers understand why accessibility is crucial for many people in making their daily lives a lot easier. In each chapter, using these personas, the authors explain how accessibility changed each character's life for the better. This helps to develop empathy and convince Web developers to think of actual people when making design decisions.

A Web for Everyone is not addressed to inexperienced Web developers. The book only provides broad design information and assumes you already know how to design a Web site. Unfortunately the title is not very clear and one might buy the book by mistake, thinking it is a manual on how to develop Web sites. However, this book is useful for anyone interested in making content more accessible because it teaches how to polish your writing and design your content to make it clear and concise.

Sarah Santos Bastos

Sarah Bastos holds a BA in English and has six years of experience with applied linguistics, foreign languages, and translation. She is currently pursuing an MA in English with a certificate in technical communication at the University of Alabama in Huntsville where she teaches writing as a graduate teacher assistant.

Lean Customer Development: Build Products Your Customers Will Buy

Cindy Alvarez. 2014. Sebastopol, CA: O'Reilly. [ISBN: 978-1-449-35635-4. 222 pages, including index. US\$24.99.]



Lean Customer Development: Build Products Your Customers Will Buy is the fifth book in The Lean Series, edited by Eric Ries. The series was created in response to *The Lean Startup*, written by Ries. If you haven't read *The Lean Startup* or any other books in The Lean Series, you can read and enjoy this book; there are no prerequisites.

When you read *Lean Customer Development*, give yourself a day to read it. Total immersion in the text is the best way to read this book. At 206 pages, it's a day's read and the argument is best understood if you read it in a consolidated period. After the initial reading, if you're like me, you'll find yourself re-reading sections to ensure your memory is accurate, but you'll know what is recommended and have time to think about how it applies to your work life.

The book is an argument for changing the way we work. You might work in an enlightened group that already practices customer development, but most of us don't. We work in product development environments and, as Alvarez argues in chapter 1, we need to change this model.

Gone are the days of developing products that we hope people will want to buy. We cannot rely on hope and once-a-year shipments to pay the bills. We need to change to a model that is built on continuous customer input to build something (let's say software) that is needed. As we understand the customer's needs, we can create the minimal viable product (MVP), deliver it, learn from how the customer uses this delivery, and iterate to improve for future deliveries.

While I love the subject matter, Alvarez makes *Lean Customer Development* easy to read for people who might not find themselves naturally inclined to read about development processes. Her writing style is practical with many examples. To get started in the customer development process, she gives us three exercises to complete.

These exercises are followed by an explanation of how to identify customers, how to reach out to these target customers, and how to interact with people when you have scheduled engagements. Alvarez explains the process of identifying the MVP. The book ends with an excellent explanation of why and how to close the communication loop (p. 190).

I finished this book motivated to change. I find myself wanting to make the development process more customer-centric because I agree that product development is a thing of the past. Attempts to change to a more customer development process are well received.

Change happens slowly. It might be that your organization doesn't make the drastic changes outlined in the book *Lean Customer Development* but, over time, the development process changes because the employees

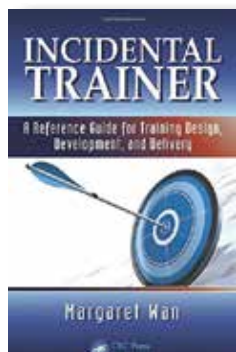
start to change the organization. Change has to start somewhere, and you can be an agent by reading this book and using it to make yourself a better employee.

Angela Robertson

Angela Robertson works for IBM in Research Triangle Park, NC. Angela has an MS in technical communication from North Carolina State University.

Incidental Trainer: A Reference Guide for Training Design, Development, and Delivery

Margaret Wan. 2014. Boca Raton: FL: CRC Press. [ISBN: 978-1-4398-5790-8. 217 pages, including index. US \$79.95.]



All too often I have found myself in a training session with a respected colleague who fails miserably at delivering an effective presentation. The training not only is a waste of my time, but I also lose respect for the person giving it. This scenario is all too common in the workplace, and it is unfair to those who are required to take the

training as well as the poor soul who was talked into giving it. As Wan points out, being a subject matter expert (SME) does not automatically make one an effective trainer. She wrote *Incidental Trainer: A Reference Guide for Training Design, Development, and Delivery* for SMEs who find themselves in the situation where they are asked to give “incidental” training simply because they are good at their jobs.

This book is an easy, quick read. The first half covers the “Fundamentals of Training,” which includes important information that an incidental trainer should know before delivering a training session, such as conducting a needs assessment, developing a training plan, writing learning objectives, training for different learning styles, creating effective presentations, and much more. If more trainers used this information, participants would deem the training sessions more beneficial instead of a waste of time. The one reaction I can see an incidental trainer having is that such careful planning takes a considerable amount of time that is

not built into their regular work schedule; thus, the appendices offer helpful templates that may alleviate these time-consuming tasks.

The second half of the book—“Training, Like the Pros”—provides incidental trainers with detailed information about the more complex training aspects, such as developing valid and reliable tests, conducting meaningful surveys, and teaching to four different generations of learners. This section has two chapters that one should read before launching into the fundamentals of training in Part 1. “Training a Multicultural Workforce” is one such chapter. The workplace “is” multicultural, and cultural considerations should be at the forefront of a training plan. Likewise, the last chapter on virtual training and distance learning should follow as online training is more likely the “go-to” type of training although it is not always the most effective, especially when it is not well designed. While this chapter mentions that face-to-face training cannot simply be “moved” online, more information about online pedagogy is warranted, especially due to the popularity—and yet the often dismal delivery—of online training in the workplace. Furthermore, Wan mentions accessibility a few times; however, more attention to the specifics of accommodating learners with disabilities should be a primary consideration of all trainers.

This is a valuable book that incidental trainers, full-time trainers, instructors, and all college students would benefit greatly from by having it in their desktop arsenal of resources for the workplace.

Diane Martinez

Diane Martinez is an assistant professor of professional and technical communication at Western Carolina University. She previously worked as a technical writer in engineering, an online writing instructor, and an online writing center specialist. She has been with STC since 2005.

The Handbook of Development Communication and Social Change

Karin Gwinn Wilkins, Thomas Tufte, and Rafael Obregon, eds. 2014. Malden, MA: Wiley-Blackwell. [ISBN 978-1-118-50531-1. 512 pages, including index. US\$195.00.]



The strength of *The Handbook of Development Communication and Social Change* comes from the breadth of its selections and authors. It bridges the gaps between theory and practice, besides challenging long-held assumptions about development communication. The book also addresses topics as varied as public health, the environment,

and economics, making it a particularly well-rounded collection that accounts for the complexity of the situations in which such communication takes place. Each section concludes with a chapter that synthesizes the work of the authors in the section to discover emerging issues in the field.

The first third of the book focuses on theories and histories of development and social change. In this section, Toby Miller's "Globalization & Development" is a standout, critiquing the tendency to portray communication technology (including social media) as a savior for the Global South. Another is Alfonso Gumucio-Dagron's "Indigenous Communication: From Multiculturalism to Interculturality," in which the author argues that mainstream media exclude indigenous cultures from fair coverage. This exclusion heightens the importance of community and alternative media as a method of communication between those cultures and the national cultures within which they reside.

The next section examines the numerous methods by which development information has and can be communicated. "Storytelling for Social Change," by Kate Winskell and Daniel Enger, argues that narrative's overwhelming presence in cultural life makes it a natural fit for communicating social change practices.

Other chapters address the use of community theater and the increasingly popular entertainment-education frameworks for initiating social change.

The final section of the handbook shifts its focus to activism and social change. This is perhaps the

most intriguing section, as it highlights the practical applications of communicating for social change; however, each of these chapters has a firm theoretical basis. In this section, chapters engage with the range of media opportunities now available to citizens, including watchdog groups, citizens' journalism, and activist video. Norbert Wildermuth's "Transparency and Social Accountability" is an excellent addition here, addressing how organizations can clearly communicate their work toward social change and explaining why its stakeholders might wish them to do so.

As a whole, this collection provides an international perspective on development communication and social change, making it a strong addition to courses on activist rhetoric, development communication, and international communication.

Ashley Patriarca

Ashley Patriarca is an assistant professor in English at West Chester University in Pennsylvania, where she teaches courses in technical and business writing. Her research interests include risk and crisis communication, grant writing, and technical editing. She is a member of the Philadelphia Metro chapter of STC.

Computer Simulation, Rhetoric, and the Scientific Imagination: How Virtual Evidence Shapes Science in the Making and in the News

Aimee Kendall Roundtree. 2014. Lanham, MD: Rowman & Littlefield. [ISBN 978-0-7391-7556-9. 130 pages, including index. US\$75.00 (softcover).]



In her stimulating book, *Computer Simulation, Rhetoric, and the Scientific Imagination: How Virtual Evidence Shapes Science in the Making and in the News*, Aimee Kendall Roundtree shows how computer simulations provide an alternate way of conducting science. Unlike traditional scientific methods derived from deduction and

induction, which can only model reality through fixed, symbolic snapshots of dynamic situations (such as equations, graphs, or mathematical models), computer

simulations are dynamic representations that “put models into motion” and “capture a model’s behaviors” as they occur (p. 3).

The virtual evidence created through simulation is produced through a third form of logic, abductive reasoning, “whereby premises and conclusions share a degree of uncertainty” (p. 72). Abduction lets scientists introduce ad hoc variations in the model derived from their experience and intuition, rather than purely from strict reasoning or empirical evidence, and to create “‘what if’ possibilities” (p. 72) that comport more precisely with what they think the process, in their judgment, should be like.

Roundtree shows how these variations are actually rhetorical devices, such as “negatio,” “prolepsis,” and “concessio,” that scientists employ “in creating the virtual representation of actual phenomena” (p. 61, pp. 71-72). The devices enact static equations visually, in real time, and with abductively derived evidence that represents the complexity of the process much more precisely and dynamically, and less reductively, than traditional models.

Simulations cannot abandon traditional reason and evidence altogether. They must maintain enough verisimilitude, both logical and experiential, to be persuasive. Virtual evidence “can retain truth value even when missing components vital to the actual object” (p. 36). It preserves the core values of deduction and induction while accommodating ad hoc insight and personal judgment. Here Roundtree’s notion of virtual evidence converges with Walter R. Fisher’s theory of “narrative rationality,” the inclusion of elements to reinforce an argument’s fidelity to both rational and non-rational aspects of human experience.

Simulations can be understood as computer-aided examples of Aristotle’s “*energeia*,” or the rhetorical creation of meaning “as it is being carried out or as it is being fully worked out” (p. 37). Although it “approaches, but never achieves, actual status” (p.34), a simulation, as “*energeia*,” “can have explanatory and persuasive power while or before it is being proven—in the middle of action”—and thereby can enhance the accuracy of classical scientific models by fitting them more realistically into a simulacrum of fluid reality (p.38).

Roundtree’s account of scientists simulating bumblebee flight, the explosion of supernovae, climate change, and her analysis of how the media reports on science, amply demonstrates that rhetoric both influences

scientific debate and serves “as a foundational tool in the production of scientific knowledge itself” (p. 43).

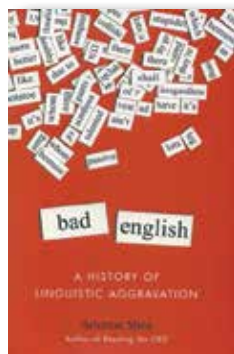
Roundtree’s thought-provoking analysis is recommended as a sourcebook for technical communicators seeking to understand how rhetoric works in scientific documentation, especially that involving computer simulations of procedures, usability interfaces, and other dynamic online content.

Donald R. Riccomini

Donald R. Riccomini is a member of STC and a lecturer in English at Santa Clara University, where he specializes in teaching engineering and technical communications. He previously spent twenty-three years in high technology as a technical writer, engineer, and manager in semiconductors, instrumentation, and server development.

Bad English: A History of Linguistic Aggravation

Ammon Shea. 2014. New York, NY: Penguin Group. [ISBN 978-0-399-16557-3. 256 pages, including index. US\$24.00.]



Bad English: A History of Linguistic Aggravation offers informative etymological insight into dozens of commonly debated, irksome words and phrases and serves as a significant guide for writers and editors. Technical communicators will find this book to be a helpful guide for writing as well as a thought-provoking read.

Shea provides clear, concise evidence to support his claim that English language users should accept the inevitable shift in the language instead of imposing antiquated, nonsensical “rules” upon it. He prefers describing how the English language is used, instead of stating how it should be used.

Bad English begins with a discussion on semantic shifts—when a word’s meaning alters over time—spotlighting words such as “literally” and “decimate.” Shea first introduces us to the explanation of a word’s etymology and its historical discussions and debates, which continue throughout the book.

The second chapter, “Words That Are Not Words,” introduces words such as “stupider” and “irregardless,” and reminds readers that they might not always agree with the author (Shea asserts both words are perfectly acceptable). While he presents a convincing argument for “stupider,” Shea carelessly handles the supporting evidence for “irregardless.”

The following chapter tackles splitting infinitives, beginning sentences with “but” or “and,” choosing “that” or “which,” and ending sentences with a preposition. Shea offers interesting historical background information about these issues—their first use and misuse, their evolution, ensuing arguments from their use/misuse, and the major players in those arguments. The witty author even provides his own opinions, which are valuable considering his knowledge about the subject. The overall conclusion is that if committing these “sins of grammar” makes the sentence sound better, then do it, because that is more important than violating an old, illogical rule.

The last chapter is a dictionary-styled list of “221 Words That Were Once Frowned Upon,” and seems to be a last-minute authorial decision made for the sole purpose of including extra words that he could not incorporate into the main corpus.

Shea’s overall message is that the English language is changing—it has been for centuries—and is always evolving, which is how we know that it is thriving. He suggests that English speakers embrace this change and realize its beauty.

Bad English is chunked into seven chapters, most of them practical. Although the chapters lack a sense of flow throughout the book and within themselves, it works here. This was the perfect read for an employed graduate student. The book is not only an easy, enjoyable read, but it is also an informative, useful tool for writers and editors in any field.

Kala Burson

Kala Burson is currently earning a master’s degree in English with a technical communication certificate at the University of Alabama in Huntsville. Her focus is in linguistics with an interest in editing.

Legal Issues in Global Contexts: Perspectives on Technical Communication in an International Age

Kirk St.Amant and Martine Courant Rife, eds. 2014. Amityville, NY: Baywood Publishing. [ISBN 978-0-89503-836-4. 238 pages, including index. US\$50.95 (softcover).]



Technical communication analysis used to be a simple matter: what must be done to make this machine or process work? Then, the user’s knowledge and abilities appeared: what can the user do to make this machine or process work? Further complicating matters, the information used in the document frequently had to cross international boundaries

where the communicator faced a myriad of laws governing that material and laws governing digital rights. We are beginning to see research and even institutes devoted to international laws as they apply to intellectual property, the concept of common knowledge, and other issues.

St.Amant and Rife’s anthology, *Legal Issues in Global Contexts: Perspectives on Technical Communication in an International Age*, offers technical communicators a fast way to learn about international law as it affects their work. In the 10 essays plus a foreword, introduction, and afterward, technical communication and legal scholars offer “a framework for understanding the central issues involved in [international law]” so that communicators can make “informed and effective decisions for actions in global contexts” (p. x).

Laws, according to the editors, codify the cultures that make them so that a clash of laws becomes a clash of cultures. Technical communicators preparing documents add not only the culture of the reader to the analytical process, but also the various laws reflecting international cultures.

Although my example is straightforward, it does represent the essence of the problems now facing technical communicators—both those who work for an organization and independent contractors. Knowing how to create and design content is no longer enough. Students and practitioners must be familiar with different legal aspects of the information they use, and that is this collection’s focus.

In Part I (containing 4 essays), the authors address the new situation brought about by the expanding legal complexities in global settings. These include privacy and international situations in online education, net neutrality, online virtual worlds, and legal implications of the metric system. Part II (3 essays) moves the discussion into language and access in such legal issues as the European Union's mandate that the language used must be the document user's, translation, and usability. Part III (3 essays) tries to make sense of the laws in global contexts, including communication theory and practice, software patent law, and orphan works.

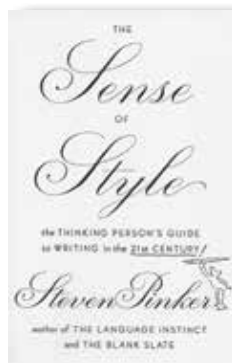
Combining this anthology with Beldiman's, *Access to Information and Knowledge: 21st Century Challenges in Intellectual Property and Knowledge Governance* (reviewed in this same issue) gives the technical communicator a good overview of cross-cultural communication and international laws. The current anthology, however, has the advantage of being focused on the specific problems faced by technical communicators. If your work involves international communication, then I recommend the anthology. Academics can also use it for their advanced classes to help future technical communicators understand communications that cross international borders and cultures.

Tom Warren

Tom Warren is an STC Fellow, Jay R. Gould Award for Excellence recipient, and professor emeritus of English (technical writing) at Oklahoma State University, where he established the BA, MA, and PhD technical writing programs. Past president of INTECOM, he serves as guest professor at the University of Paderborn, Germany.

The Sense of Style: The Thinking Person's Guide to Writing in the 21st Century

Steven Pinker. 2014. New York, NY: Viking Adult. [ISBN 978-0-670-02585-5. 360 pages, including index. US\$27.95 (hardcover).]



With dozens of books offering writing advice out there, do we really need another?

After examining the strengths and weaknesses of existing guides, Pinker argues that the considerable progress made in cognitive science in recent years cries out for a fresh approach. We now have “an understanding of grammatical phenomena which

goes well beyond the traditional taxonomies based on crude analogies with Latin,” “a body of research on the mental dynamics of reading,” and “a body of history and criticism which can distinguish the rules that enhance clarity, grace, and emotional resonance from those that are based on myths and misunderstandings” (p. 6).

Pinker translates these new understandings into practical advice for the working writer in this delightful, informative guide. He is a cognitive scientist, linguist, Harvard psychology professor, and Chair of the usage panel of the American Heritage Dictionary. Pinker is also a best-selling author of more than a dozen books on language and other topics.

To make his points, Pinker disassembles passages of exemplary prose to show how they work, and discusses various writing styles in terms of their effect on the reader. For most purposes, he recommends a classic style—a style modeled on a conversation among equals. Classic style offers a window on the world and uses clear explanations and concrete examples. Classic style “makes the reader feel like a genius. Bad writing makes the reader feel like a dunce” (p. 36).

Besides poor style choice, much incomprehensible writing stems from what Pinker calls “the curse of knowledge” (p. 57), the writer's failure to comprehend or appreciate that the reader doesn't know what the writer knows. This can lead to poorly chosen focus, excessive abstraction, using incomprehensible jargon, omitting concrete details the reader needs, and a host of other faults.

Drawing on new understandings of grammar and syntax, Pinker provides fresh explanations that are clear,

lucid, and likely to be remembered and applied. Along the way, he shows that the rules are not a series of traps, but valuable tools that make sharing ideas possible by helping you avoid convoluted and misleading prose. Pinker also shows how to gracefully link sentences into larger units of what he calls “arcs of coherence” that help readers “grasp the topic, get the point, keep track of the players, and see how one idea follows from another” (p. 139).

Pinker finishes by addressing dozens of thorny issues of correctness and usage. With clarity and wit, he separates truths from half-truths, myths, peeves, and ham-fisted advice, and gives careful writers the information they need to push back against usage scolds and overzealous copyeditors.

Whether you're a working writer who wants to improve your craft or someone who just wants to better understand how language works at its best, get *The Sense of Style*. Both wise and practical, this superb guide is as good as they come.

Patrick Lufkin

Patrick Lufkin is an STC Associate Fellow with experience in computer documentation, newsletter production, and public relations. He reads widely in science, history, and current affairs, as well as on writing and editing. He chairs the Gordon Scholarship for Technical Communication and co-chairs the Northern California Technical Communication competition.

Exploding Technical Communication: Workplace Literacy Hierarchies and Their Implications for Literary Sponsorship

Dirk Remley. 2014. Amityville, NY: Baywood Publishing Co. [ISBN 978-0-89503-890-6. 196 pages, including index. US\$46.95 (softcover).]



Exploding Technical Communication: Workplace Literacy Hierarchies and Their Implications for Literary Sponsorship is a well-researched historical case study of how technical and professional communication practices at a World War II arsenal sponsored literacy within the community in which it operated from 1940

to 1960. The Training within Industry (TWI) methods developed by the U.S. government and industry at that time included multimodal literate practices, particularly combinations of visual, oral, experiential, and print-linguistic text. Remley's analyses reveal a hierarchy in which print-linguistic literacies were esteemed at the workplace and in the community. This literacy hierarchy contributed to a catastrophic accident that killed 11 people, prompting changes in the approach to designing training documents.

Grounded well within the framework of new literary studies and Deborah Brandt's notion of literacy sponsorship, Remley uses one workplace incident to show how technical communication practices illustrate the value of using multiple modes of representation to communicate. By focusing on a “particular temporal and geographic ecology of literacy practices and sponsorship” (p. 14), he links technical communication with professional communication, and the responsibility institutions have in sponsoring literacy for their employees, even outside workplaces, and in encouraging multiliteracies.

The book's primary research question is: “As a major employer..., how did the government and operators of the ... Arsenal sponsor literacy for its employees and for the community ..., and what ecological factors influenced this sponsorship?” (p. 14). In answer, *Exploding Technical Communication* contributes to an understanding of the social and material consequences of institutional sponsorship associated with workplace communication. The book contributes to the fields of technical communication, managerial communication, and literacy studies by 1) offering insights into what contributes to effective multimodal rhetoric in technical communication; 2) considering potential implications of the balancing act associated with multiple modes of literacy and sponsorship; and 3) making literacy sponsorship and multimodality relevant to today's economy, educational philosophies, and culture.

The TWI methods used in training and system improvement during World War II are currently applied in business and industry as part of the lean operating and continuous improvement philosophies. These methods have also become part of the experiential learning philosophy favored in academia. Remley includes examples of current applications of multimodal forms of technical communication similar to those used at the WWII arsenal as well as new media applications related to training and

instruction. He demonstrates their implications for literacy sponsorship and the interrelationships of workplace, home, school, and community—what he calls a complex ecology of literacy practices.

Exploding Technical Communication thoughtfully provides a historical basis for technical and business communicators and literacy scholars and educators, as well as practical case studies for business leaders, managers and supervisors, consultants and practitioners, and even history buffs. An academic book at its core, scholars and practitioners alike will find a thorough advancement of Brandt's theory of sponsors of literacy that "recognizes the intersections that affect a given ecology of literacy and ways that institutions that act as literacy sponsors affect that ecology" (p. 17).

Liz Pohland

Liz Pohland is an STC Senior Member, Editor of *Intercom* magazine, and the director of communications for STC. She is pursuing her PhD at Texas Tech University's Technical Communication and Rhetoric program. Her research interests include museum studies, new media, and digital humanities.

Publishing Fundamentals: Unstructured FrameMaker 11

Matt R. Sullivan and Sarah S. O'Keefe. 2013. Research Triangle Park, NC: Scriptorium Press. [ISBN 978-0-9828118-5-3. 640 pages, including index. US\$49.95 (softcover).]



Coming in at 640 pages, *Publishing Fundamentals: Unstructured FrameMaker 11* has a hefty "thud" factor.

Once you get past the introductory front matter, the authors divide the book into 7 sections: Getting Started with FrameMaker, Creating and Manipulating Text, Controlling Page

Layout, Building Books, Creating Output, Advanced Techniques, and Appendixes.

If you're new to using FrameMaker, you do not want to skip around the chapters and sections, as the sections build upon the previous information. Advanced users can skip the first five chapters, but should pay close attention to the latter half of chapters 6–10 before delving into chapters 21–29 and the appendices.

Publishing Fundamentals: Unstructured FrameMaker 11 is a great resource, and deserves to be on the reference shelf for both new and advanced users.

Rachel Houghton

Rachel Houghton is an information developer with more than 17 years of technical communication experience. She is a former secretary for the Society for Technical Communication (STC), past program chair of the STC Technical Communication Summit, actively involved in the STC Phoenix community, and reviews books for the STC journal, *Technical Communication*.

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Lyn Gattis, Editor

The following articles on technical communication have appeared recently in other journals. The abstracts are prepared by volunteer journal monitors. If you would like to contribute, contact Lyn Gattis at LynGattis@MissouriState.edu.

“Recent & Relevant” does not supply copies of cited articles. However, most publishers supply reprints, tear sheets, or copies at nominal cost. Lists of publishers’ addresses, covering nearly all the articles we have cited, appear in *Ulrich’s international periodicals directory*.

Collaboration

Functional and nonfunctional quality in cloud-based collaborative writing: An empirical investigation

Kim, J., Mohan, K., & Ramesh, B. (2014). *IEEE Transactions on Professional Communication*, 57, 182–203. doi: 10.1109/TPC.2014.2344331

“Collaborative writing has dramatically changed with the use of cloud-based tools, such as Google Docs. System quality—both functional (i.e., what services the system provides) and nonfunctional quality (i.e., how well the system provides the services)—influences user satisfaction with these tools. . . . [To explore the question of whether] functional and nonfunctional quality influence[s] user satisfaction in cloud-based systems that support collaborative writing. . . [the researchers] conducted a survey of 150 undergraduate students enrolled in an information systems course at a large urban university. . . . The results show that functional and nonfunctional quality play[s] a critical role in shaping user satisfaction with cloud computing and that nonfunctional quality has a stronger impact than functional quality. . . . To ensure satisfaction with cloud computing, organizations need to provide adequate development and maintenance resources to ensure both types of quality, and they need to recognize that nonfunctional quality plays a key role in shaping user satisfaction with cloud computing.”

Lyn Gattis

Communication

The blurring boundaries between synchronicity and asynchronicity: New communicative situations in work-related instant messaging

Darics, E. (2014). *International Journal of Business Communication*, 51, 337–358. doi: 10.1177/2329488414525440

“Instant messaging is one of the most popular communication technologies in virtual teams, enabling interactions to intertwine whole working days, thus creating the sense of copresence for team members who are geographically dispersed. Through close linguistic analyses of naturally occurring data from a virtual team, this article discusses the implications of two novel communicative situations enabled by instant messaging: presence information and the persistence of transcript. The preliminary findings of this study indicate that these new communicative situations require the flouting or rethinking of previously existing interactional norms and that communicative practices employed by the team members are not yet conventionalized/normalized; the expectations and interpretations of interactional rituals and timing vary highly, even within the same virtual team.”

Katherine Wertz

Gauging openness to written communication change: The predictive power of metaphor

Suchan, J. (2014). *Journal of Business and Technical Communication*, 28, 447–476. doi: 10.1177/1050651914536187

Suchan informs that specific types of revisions in technically written documents may impact employees' performance which, in turn, is one reason that technical and professional communicators must be intentional in writing precise words and using effective designs. "This study gauges workers' degree of openness to significant changes in the organization, style, and design of a written report by analyzing metaphors that emerge from their talk about their report-reading and decision-making tasks. Workers at two work sites—in Maryland and in Washington, DC—responded to two typical work reports: one written in the style currently in use and another in a fundamentally different style exhibiting features that make documents easy to read and understand. The dominant metaphor that the Maryland workers used was 'the whole-man' approach, which represented the workers' flexible approach toward work tasks that resulted in their willingness to accept the fundamentally different report. In contrast, Washington DC workers used the metaphors 'paint by the numbers' and 'stay within the lines' when describing their work. These metaphors suggest the workers' adherence to organizational routines and uncomfortableness with change that caused them not only to reject the new reports but also to have strong emotional reactions toward them. These results indicate that assessing organizational talk, particularly the metaphors people use, is a useful tool in gauging workers' perceptions about and degree of openness toward communication change."

Sean C. Herring

Making the pitch: Examining dialogue and revisions in entrepreneurs' pitch decks

Spinuzzi, C., Nelson, S., Thomson, K. S., Lorenzini, F., French, R. A., Pogue, G., Burbach, S. D., & Momberger, J. (2014). *IEEE Transactions on Professional Communication*, 57, 158–181. doi: 10.1109/TPC.2014.2342354

This study examined ways "Korean entrepreneurs in an entrepreneurship program revised their slide decks for

their presentations ('pitches') in response to professional communication genres representing feedback from potential stakeholders in their target markets. . . . In this exploratory qualitative study, researchers textually analyzed 14 sets of five related document genres in the archives of an entrepreneurship program. These genres represented a full cycle of activity: application to the program, initial pitches, initial feedback from program personnel, detailed feedback from representative stakeholders in the target market, and revised pitches. Interviews and surveys of program personnel further contextualize the data. . . . [Results indicated that] [e]ntrepreneurs revised their claims and evidence based on their dialogue with their target market. Some of the entrepreneurs altered their slides to make more complex arguments rebutting stakeholders' concerns. These findings suggest that entrepreneurs engage in dialogue with their target markets, but their engagement tends to be guided by tacit, situated experience rather than through an explicit, systematized approach."

Lyn Gattis

Design

Increasing accessibility with a visual sign system: A case study

Winn, W. (2014). *Journal of Technical Writing & Communication*, 44, 451–473. doi: 10.2190/TW.44.4.f

"Visual sign systems have become an essential means of communication in places where large numbers of people of different nationalities gather, such as at international airports and the Olympic Games. That they can effectively increase accessibility among users not necessarily sharing a common language speaks to their potential usefulness in other situations. A homeless shelter in a western North Carolina community received funding to build a new facility. With the clientele's widely diverse communication abilities, including those who are illiterate or have limited reading skills, those who are non-native speakers knowing little to no English, and those who are coming from different cultural contexts, a visual sign system was designed to facilitate navigation for all visitors. Using Peirce's theory of signs, Neurath's ISOTYPE, and the least

action principle borrowed from physics as a framework, this case study shows how the signs were designed and usability tested to ensure increased accessibility.”

Nick Carrington

Map design for complex architecture: A user study of maps & wayfinding

Cheng, K., & Pérez-Kriz, S. (2014). *Visible Language*, 48, 5–33. [doi: none]

The research described in this article “seeks to determine if a printed, paper map can aid visitors in navigating through complex architectural environments. Specifically, [the authors] report on the design and testing of two different paper maps intended to help patients find dental clinics and related offices within a large medical and health sciences center. As part of an iterative design process, [the authors] first identified a variety of design factors that influence the cognitive aspects of using maps during wayfinding, and redesigned an existing map of the environment based on those principles. [The authors] then conducted user testing to further determine what information should be included or excluded on the map and to see if changes in format enhanced or detracted from communication goals. The results show that maps can indeed assist visitors in finding their way through complex buildings, but that there are limitations to their ability to overcome architectural barriers.”

Lyn Gattis

Typographic features of text: Outcomes from research and practice

dos Santos Lonsdale, M. (2014). *Visible Language*, 48, 29–67. [doi: none]

“This paper presents a comprehensive review of literature on the legibility of printed text in order to provide informed guidance on the design and preparation of typographic materials. To this end, experimental findings are taken into account, as well as the perspective of typographers, graphic designers, and authors. First, the typographic features of text are reviewed and illustrated individually to identify all the features that specifically characterise text layouts. It is emphasized, however, that the various typographic features should be selected in relation to each other, and that it is the

combination and manipulation of all these typographic features as a group that makes the text legible. Studies are then reviewed and illustrated on the typographic structure of text as a whole. This information will prove useful to anyone involved in the development of typographic materials, including typographic and graphic designers, teachers and students.”

Lyn Gattis

Typographic layout and first impressions: Testing how changes in text layout influence readers’ judgments of documents

Moys, J.-L. (2014). *Visible Language*, 48, 40–67. [doi: none]

“This study explores how the typographic layout of information influences readers’ impressions of magazine contents pages. Thirteen descriptors were used in a paired comparison procedure that assessed whether participants’ rhetorical impressions of a set of six controlled documents change in relation to variations in layout. The combinations of layout attributes tested were derived from the structural attributes associated with three patterns of typographic differentiation (high, moderate, and low) described in a previous study. . . . The content and the range of stylistic attributes applied to the test material were controlled in order to focus on layout attributes. Triangulation of the quantitative and qualitative data indicates that, even within the experimental confines of limited stylistic differentiation, the layout attributes associated with patterns of high, moderate, and low typographic differentiation do influence readers’ rhetorical judgments. In addition, the findings emphasize the importance of considering interrelationships between clusters of typographic attributes rather than testing isolated variables.”

Lyn Gattis

Education

Academic territorial borders: A look at the writing ethos in business courses in an environment in which English is a foreign language

Annous, S., & Nicolas, M. O. (2015). *Journal of Business and Technical Communication*, 29, 93–111. doi: 10.1177/1050651914548457

This article focuses on a consideration of writing principles in an academic environment in which English is a foreign language. While the instructors did not nurture student communication in English, the information and guidance provided are applicable when English is the second language in technical writing classrooms. “With the globalization of higher education, English has become the lingua franca of universities operating in non-English-speaking countries seeking internationalization. The communication needs of students studying in such foreign-language contexts have not been fully explored. In this study, the authors interviewed a purposeful sample of professors teaching a variety of specialties in the School of Business in an environment in which English is a foreign language in order to ascertain their perceptions of students’ ability to communicate in English, and these teachers’ ability to focus on their students’ writing skills. The findings reveal that although these teachers asserted the importance of communication skill, particularly in written English, they did not feel that nurturing that skill was part of their academic responsibilities. They felt that they had neither the time nor the expertise to nurture students’ ability to communicate in English.”

Sean C. Herring

Slide presentations, seriously

Mollerup, P. (2014). *Visible Language*, 48, 4–21. [doi: none]

“This article addresses the informative quality of slide presentations in university lectures. The arguments also apply to slide presentations in other situations. The article presents a number of principles to improve the graphic quality and use of slide presentations. These principles build on a review of relevant literature and on the author’s experience and reflection. Research in this area is limited in quantity and depth.”

Lyn Gattis

Ethical and legal issues

Avoiding litigation for product instructions and warnings

Todd, J. (2014). *Journal of Technical Writing & Communication*, 44, 401–421. doi: 10.2190/TW.44.4.d

“The plaintiff suing for injuries arising from a product with allegedly defective instructions or warnings has the burden of proving each of the elements for every cause of action asserted, while the defendant prevails by defeating just one element for each cause of action. Technical communicators can increase their legal literacy by learning the elements that are most easily defeated and thereby avoid subjecting their product instructions and warnings to litigation. This article surveys the existing scholarship to show the need for more attention to legal terms, theory, and practice before explaining how lawyers approach litigation. The article then turns to each of the main causes of action—the functional approach of the Restatement (Third) of Torts: Products Liability, negligence, and breach of express warranty and misrepresentation—with an emphasis upon the elements that are most within the control of the technical communicator.”

Nick Carrington

Mining engineers and fraud in the U.S.–Mexico borderlands, 1860–1910

Grossman, S. E. M. (2014). *Technology and Culture*, 55, 821–849. doi: 10.1353/tech.2014.0122

“In the U.S.–Mexico borderlands during the late nineteenth century, concern about the existence of mining fraud—be it stock manipulation, salting, or straight-up false advertising—was prevalent in the mining community. The belief that fraud was endemic in the region forced the small community of mining engineers working there to tailor their presentation of themselves as technical professionals in relation to these pervasive concerns about fraud. The ways in which mining engineers in this time and place addressed the problem of fraud illustrates how technical-knowledge claims are mediated through the local concerns of professional engineers.”

Edward A. Malone

Information management

Automating DITA builds: Lightweight continuous integration for documentation projects

Fienhold Sheen, R. W. (2014). *Best Practices*, 16, 77, 81–87. [Center for Information-Development Management] [doi: none]

“Expensive solutions are not necessary to automatically publish XML content. There are many ways to automate the process, and a range of open source tools and scripting solutions can be used. Using a software development technique known as ‘continuous integration’ (CI), documentation teams can publish even minor changes regularly without manual intervention. By building the entire publication with each revision, authors can easily verify the impact of their changes on the final document and find errors more quickly. This approach reduces the need for repetitive manual tasks, allowing authors to focus on content and improve document quality. This article introduces several approaches to automated XML publishing and provides examples for lightweight continuous integration from scheduled builds to watched folders and commit hooks to hosted systems.”

Lyn Gattis

A statistical approach for visualizing the quality of multi-hospital data

Connolly, B., Faist, R., West, C., Holland, K. D., Matykiewicz, P., Glauser, T. A., & Pestian, J. (2014). *Visible Language*, 48, 69–85. [doi: none]

“The age of Big Data and the associated proliferation of large data sets have necessitated the development of methods that allow for an easy interpretation of data analysis results. Such methods are usually the product of a symbiotic relationship between the [fields] of data visualization, infographics, and statistics. In this work [the authors] explore the interplay between data visualization and the mathematical framework used to analyze inter-hospital differences in database queries. Such differences can reflect disparities in the quality of care or more fundamental disparities in data quality. As the volume of queries is large and increasing, it is important to develop an incisive way of visualizing these differences. Specifically, [the authors] demonstrate the importance of choosing a mathematical framework that calculates the statistics necessary to visualize the results in a maximally concise and intuitive way. [The authors] derive symbolic statistical representations of inter-hospital query differences using a Bayesian probabilistic formalism to indicate statistically significant discrepancies. These statistical representations serve the need for visual representation of differences and their meaning apart from statistical expertise. The calculations were performed with a publicly-available package, DQM, available at <http://sourceforge.net/projects/databasequalitymanagement>.”

Lyn Gattis

Instructions

The trouble with networks: Implications for the practice of help documentation

Swarts, J. (2014). *Journal of Technical Writing & Communication*, 44, 253–275. doi: 10.2190/TW.44.3.c

“This article considers why users of popular software packages choose to find answers to their task problems on user forums rather than in official documentation. The author concludes that traditional documentation is developed around an antiquated notion of ‘task,’

which leads to restrictive ways of thinking about problems that users encounter and the solutions that might be appropriate. The author argues, instead, that tasks and problems arise from networked rhetorical situations and networked contexts for rhetorical action. The influence of networks requires a redefinition of rhetorical situation and context, from which we derive a networked picture of tasks and problems as emergent and uncertain phenomenon, best addressed in the uncertain and sometimes-chaotic setting of user forums. Forum threads are studied using discourse analytic techniques to determine what they can reveal about qualities making tasks and problems uncertain.”

Nick Carrington

Intercultural communication

(mis)understanding: icon comprehension in different cultural contexts

Zender, M., & Cassedy, A. (2014). *Visible Language*, 48, 68–95. [doi: none]

“Icons are frequently used in contexts where comprehension needs to be consistent across cultural and linguistic barriers. This paper reports on a study comparing the comprehension of 54 universal medical icons in rural Tanzania and the United States of America. It finds that most of the icons were not understood cross-culturally. The premise of the study was that this misunderstanding might have two causes: cultural distinctions and lack of knowledge. To test the premise [the authors] studied icon comprehension by those in two different cultures with two levels of medical knowledge: ‘standard’ and ‘advanced’. The results show that most (33 of 47) poorly comprehended icons failed due to lack of medical knowledge or unfamiliarity with technology, while few (5 of 47) poorly comprehended icons failed due to cultural differences. Analysis of icons that failed due to cultural differences suggests that the primary drivers of cultural misunderstanding were the use of culturally sensitive metaphor and the incorporation of learned signs (nonrepresentational symbols such as words) in icon design. Awareness of these causes of poor comprehension across cultures might help designers

design effective universal icons by incorporating into the design process research methods that identify disparities of specific knowledge in the target people group and by avoiding use of metaphor and learned signs. These findings empower calls for cultural sensitivity in visual communication with guidance for implementation.”

Lyn Gattis

Translating time: Habits of western-style timekeeping in late Edo Japan

Frumer, Y. (2014). *Technology and Culture*, 55, 785–820. doi: 10.1353/tech.2014.0116

“The act of glancing at a clock to learn the time might seem quick and effortless. Yet for the early-nineteenth-century Japanese, there was nothing obvious about how to read the dial of a European clock. This article explores the ways that Japanese users learned to decipher a technological interface that not only looked significantly different from the ones with which they were familiar, but often contradicted their conventional common sense. The way late-Edo-period (1600–1868) Japanese accessed elements of a foreign technology was through their existing habits of timekeeping—habits of measuring, calculating, and depicting time, as well as handling and looking at timepieces. Understanding how existing practical, material, and visual habits enabled interpretation of foreign technology offers insight into the process of knowledge and technology transfer, which happened prior to the social and structural changes associated with Meiji-period (1868–1912) Westernization.”

Edward A. Malone

Unwriting food labels: Discursive challenges in the regulation of package claims

Jones, R. H. (2014). *Journal of Business and Technical Communication*, 28, 477–508. doi: 10.1177/1050651914536186

Jones provides insight into cross-cultural issues that may be informative to technical writing instructors as part of preparing their students for transformations into global markets. “This article examines the challenges resulting from the regulation of written discourse on food packages. It uses as a case study

Hong Kong's strict new food-labeling law that requires distributors and retailers to remove certain nutritional claims from packages of imported food before they sell them. This practice of redacting unlawful text on packages requires that distributors and retailers engage in complex processes of discursive reasoning, and it sometimes results in packages that are difficult for customers to interpret. The case study highlights important issues in the regulation of commercial texts concerning collaboration, intertextuality, and the conflicts that can arise when the principals, authors, and animators of such texts have different agendas."

Sean C. Herring

Language

We is more than you plus I: The interpretation of the we-forms in internal business communications

Dieltjens, S. M., & Heynderickx, P. C. (2014). *Journal of Technical Writing & Communication*, 44, 229–251. doi: 10.2190/TW.44.3.b

"The we-form has been analyzed in different theoretical frameworks and domains. Researchers point to the complexity of first person plural pronouns: not only can they refer to different participants in a communicative situation, but they can also be used to avoid other referential forms. In organizational discourse, however, transparency is of the utmost importance to ensure efficient communication. Based on the minute analysis of 3700 we-forms in a corpus of internal communications documents, [the authors] developed a framework for the interpretation of the we-form. Thirteen (con)textual and situational identifiers of different kinds are discussed and illustrated. In some cases the interpretation of the we-form is indicated by a single identifying element, in other cases a combination of identifying elements strengthens the interpretation."

Nick Carrington

Management

Enacting criticality in corporate disclosure communication: The genre of the fund manager commentary

Bruce, I. (2014). *International Journal of Business Communication*, 51, 315–336. doi: 10.1177/2329488414525441

"This study examines the genre of the monthly or quarterly commentary document in which managers of investment funds report on their funds to investors. The study aims to provide insights about this disclosure genre for business communication practitioners by examining its conventionalized features and the expression of critical thinking in the evaluative judgments of fund managers. A nonpurposive sample of 30 commentaries from investment funds in North America, the United Kingdom, Australasia and South Africa is rater-analyzed in relation to the social genre/cognitive genre model of Bruce [2008], which is used as a framework to identify the principal characteristics of the genre. The findings suggest that the fund manager commentary is a relatively formulaic genre with a four-move structure that reports the current performance of the fund and presents its investment strategies and their underlying rationale, based on a critical evaluation of the current state of financial or equity markets."

Katherine Wertz

Planning for the shaping force of cultural dynamics in a component content-management system implementation

Andersen, R. (2014). *IEEE Transactions on Professional Communication*, 57, 216–234. doi: 10.1109/TPC.2014.2342336

"This tutorial explains how technical communication organizations can improve their chances for a successful component content-management system (CCMS) implementation if they plan for the shaping force of cultural dynamics in the technology diffusion process. Many component content-management (CCM) thought leaders . . . recognize the necessity of gaining buy-in from all stakeholders and persuading CCMS users to change their habits of practice, follow new processes, and learn new authoring tools and methodologies. This tutorial complements existing discussions of people

factors by offering a more complex understanding of what these factors really mean and how to negotiate them. . . . This understanding is articulated through three situated views of CCMSs and their diffusion in organizations: (1) CCMSs are social constructs; (2) CCMS diffusion is a multistage, perception-driven communication process; and (3) CCMS diffusion is mediated by different components of organizational culture. . . . Given these views, CCM initiative leaders should consider the following recommendations for carrying out a CCMS diffusion project: (1) assess cultural dynamics in the organization and (2) implement diffusion enablers to facilitate shared understanding and learning and to guide actions toward common goals. Key lessons offer a comprehensive set of sample research questions that can be used to assess cultural dynamics as well as three kinds of diffusion enablers that can be implemented: interactive communication channels, training programs, and collaboratively developed guides. . . . CCM initiative leaders who understand and plan for the shaping force of cultural dynamics in the CCMS diffusion process and who follow best practices for transitioning to CCM will improve their chances for a successful CCMS implementation. . . .”

Lyn Gattis

Professional issues

Redefining the workplace: The professionalization of motherhood through blogging

Petersen, E. J. (2014). *Journal of Technical Writing & Communication*, 44, 277–296. doi:10.2190/TW.44.3.d

“Professional identity is oft explored in the field, but such identities usually reside institutionally and may exclude women who engage in professional communication from the workplace of the home. One instantiation of this extra-institutional professionalism is mom blogs, the authors of which create content, find sponsors, and address issues important to mothers. Yet the women lack legitimacy as professionals because of the title ‘mommy blogger’ and because of the notion that blogging is a hobby. [This] qualitative study explores how mom bloggers claim a professional space

in communication. [The author] interviewed 22 mom bloggers, using Faber’s . . . theory of professionalism and Durack’s . . . ideas of redefining terms, such as ‘workplace’, to include women. [The author’s] findings show that mom bloggers engage in the characteristics of professional communicators, model egalitarian professionalism, employ an ethic of care that combats elitism, and challenge the field to include their work, from the home and through new media, as professional.”

Nick Carrington

Research

Decolonial methodologies: Social justice perspectives in intercultural technical communication research

Agboka, G. Y. (2014). *Journal of Technical Writing & Communication*, 44, 297–327. doi: 10.2190/TW.44.3.e

“This article argues that many methodological approaches used in intercultural technical communication research are limited in addressing emerging social justice challenges in many post-colonial, developing, and unenfranchised/disenfranchised cultural sites, where professional communicators have begun conducting research. It offers decolonial approaches as an alternative by highlighting how these approaches are used in an intercultural research that investigates attempts to localize communication that accompanies sexuopharmaceuticals from one cultural context to another. The article also discusses some the challenges and benefits of such approaches. The ways in which scientific research is implicated in the worst excesses of colonialism remain a powerfully remembered history for many of the world’s colonized peoples. It is a history that still offends the deepest sense of our humanity. . . . Global research raises many methodological and ethical challenges for technical communicators . . . because of the cross-cultural, international, and transnational nature of the work.”

Nick Carrington

Technology

How astronomers digitized the sky

McCray, W. P. (2014). *Technology and Culture*, 55, 908–944. doi: 10.1353/tech.2014.0102

“Starting in the 1960s, astronomers’ analog view of the universe gradually transformed as scientists and engineers introduced digital computers, electronic detectors, and magnetic recording media into observatory domes and laboratories. The advantages of this were considerable: once the underlying technical architecture and social practices were in place, digital data can be more easily analyzed, manipulated, transported, and communicated. As they replaced and supplemented older technologies, astronomers’ basic research practices changed accordingly. This helped reshape norms and behaviors in the research community, altering astronomy’s moral economy. The importance of collecting, processing, and sharing digital data transcended specific institutions, individual research questions, and national boundaries. This article explores this process, using representative examples and the metaphor of data friction, focusing on both the development of hardware and data standards. For astronomers, the transition from analog to digital was, in both senses of the phrase, a universal concern.”

Edward A. Malone

Not the Eads Bridge: An exploration of counterfactual history of technology

Brown, J. K. (2014). *Technology and Culture*, 55, 521–559. doi: 10.1353/tech.2014.0094

“General readers enjoy counterfactual histories, ‘what if’ scenarios that rewrite history. Academic historians seldom write explicit counterfactuals, despite their value in isolating the causes and contingencies that shaped events. Surprisingly, historians of technology have ignored this analytic tool, even though firms and engineers commonly considered alternative designs and actions while developing a product or technology. This article provides a ‘constrained counterfactual,’ comparing two designs for bridges across the Mississippi River at St. Louis, both proposed in 1867: the Eads Bridge, and the Boomer/Post bridge. It covers three

topics: exploring the conventional narratives on the Eads Bridge (completed in 1874); comparing the Eads design to that of the Boomer/Post alternative; and offering a counterfactual service life for that proposed crossing. The article seeks to isolate why James Eads’s design and his company succeeded, and to show the analytic value of counterfactuals for historians of technology.”

Edward A. Malone

Technology and learning: Automating odd-lot trading at the New York Stock Exchange, 1958–1976

Bradford, P. G. (2014). *Technology and Culture*, 55, 850–879. doi: 10.1353/tech.2014.0128

“This study analyzes how embedded beliefs about the proper ordering of financial market activities shaped the automation of the New York Stock Exchange (NYSE) during the period, 1958 to 1976. Specifically, it focuses on how technological innovation led to the unanticipated eclipse of its odd-lot dealer function, a unique niche for handling nonstandard trades of less than 100 shares. The decision to automate through computerization initially responded to a powerful cluster of managerial, governmental, and market imperatives. In automating, a high priority was given to the preservation of the NYSE’s traditional trading model—the open outcry auction system—whose defining features dated back to the late nineteenth century. This experience illustrates how unforeseen economic consequences relating to technological adoption may adversely affect significant constituencies within a business network.”

Edward A. Malone

Theory

The scientist, philosopher, and rhetorician: The three dimensions of technical communication and technology

Garrison, K. (2014). *Journal of Technical Writing & Communication*, 44, 359–380. doi: 10.2190/TW.44.4.b

“Technical communication’s attempt to prioritize theories of scholarship and pedagogy has resulted in several authors contributing a three-dimensional framework to approach technology: the instrumental perspective, the critical humanist perspective, and the user-centered perspective. . . . This article traces connections between this framework for technical communication and the philosophies of Michel de Certeau . . . and Andrew Feenberg . . . , suggesting that the primary connection is a turn toward ‘rhetoric’ as a mediator between scientific and philosophical communication. The article concludes that the current paradigm for understanding technology can be best understood by exploring three conjoined, yet competing, mentalities between a scientific, philosophical, and rhetorical worldview. While this three-dimensional approach provides a strong foundation for technical communication pedagogy and scholarship, it should continue to be re-examined for potential anomalies as the field continues to develop an identity.”

Nick Carrington

Usability and user experience

Adopt a UTA approach to improve customer experiences

He, H. H. (2014). *Best Practices*, 16, 101, 104–106. [Center for Information-Development Management] [doi: none]

This article describes one company’s experience with a User and Task Analysis (UTA) approach to determining customers’ information needs. To connect with customers effectively, the company now uses a support Web site with print and online options for five customer roles; a support app for mobile customers, which

includes video content; and social media for new releases and discussion. The company also offers a traditional print booklet and poster to introduce new product features. Each platform was developed with customer input, such as surveys, interviews, and focus groups.

Lyn Gattis

Experiencing visual usability and aesthetics in two mobile application contexts

Silvennoinen, J., Vogel, M., & Kujala, S. (2014). *Journal of Usability Studies*, 10, 46–62. [doi: none]

“Visual attractiveness is increasingly seen as an essential factor in perceived usability, interaction, and overall appraisal of user interfaces. Visual elements in technological products are capable of evoking emotions and affective responses in users. In this paper, [the authors] focus on the role of visual usability and visual aesthetics in an experimental research setup. This study examined user experiences and preferences in relation to the visual elements of color and perceived dimensionality of two different mobile application contexts. Quantitative and qualitative data were collected using two online questionnaires in order to gain insights to user preferences of visual elements in the two different mobile applications. The results imply that colors highly improve hedonic and pragmatic qualities of an application with a task-oriented functionality, as well as an application for entertainment purposes. [The authors] found that two-dimensionality (2-D) was generally preferred by the participants. The impression of three-dimensionality (3-D) was seen as a confusing and unnecessary element in the task-oriented mobile application context. The results of this study enhance understanding of the role and the influence of visual elements on user experience. Visual elements contribute to pragmatic user experience component in terms of visual usability and to hedonic user experience component in terms of subjective preferences of visual aesthetics. In addition, the methodological approach can be utilized to study the role of visual elements in pragmatic and hedonic user experience components with different visual elements and regarding different types of user interfaces.”

Ginnifer Mastarone

Network analysis as a communication audit instrument: Uncovering communicative strengths and weaknesses within organizations

Zwijze-Koning, K. H., & de Jong, M. D. T. (2015). *Journal of Business and Technical Communication*, 29, 36–60. doi: 10.1177/1050651914535931

Although research for this article was conducted at a secondary school system, the data are applicable to technical and professional instructors in other educational systems that use surveys and formal methods to evaluate communication. “Network analysis is one of the instruments in the communication audit toolbox to diagnose communication problems within organizations. To explore its contribution to a communication audit, the authors conducted a network analysis within three secondary schools, comparing its results with those of two other instruments: interviews focusing on critical incidents and a communication satisfaction questionnaire. The results show that network analysis may complement interview and survey data in several ways, by uncovering unique problems or by explaining or corroborating problems that were uncovered by the critical incidents or the survey. The results also show that additional data are sometimes needed to make sense of network characteristics.”

Sean C. Herring

The relationship between problem frequency and problem severity in usability evaluations

Sauro, J. (2014). *Journal of Usability Studies*, 10, 17–25. [doi: none]

“The relationship between problem frequency and severity has been the subject of an ongoing discussion in the usability literature. There is conflicting evidence as to whether more severe problems affect more users or whether problem severity and frequency are independent, especially in the cases where problem severity is based on the judgment of the evaluator. In this paper, multiple evaluators rated the severity of usability problems across nine usability studies independently using their judgment, as opposed to data driven assessments. The average correlation across all nine studies was not significantly different than zero. Only one study showed a positive correlation between problem frequency and severity. This

analysis suggests that researchers should treat problem severity and problem frequency as independent factors.”

Ginnifer Mastarone

The role of technical communication in user-centered design: Ten years later

Grimes, R. (2014). *Best Practices*, 16, 101, 104–106. [Center for Information-Development Management] [doi: none]

“This article explains why it still makes sense to manage technical communication and UX [user experience] design together in pursuit of user-centered design.” The author describes the “vision of a unified team dedicated to user-centered design” in her own organization and offers some ideas for developing user-centered design in other organizations. For example, the author recommends “a single overarching vision for the entire team” and an appropriate “ratio of interaction designers to content designers . . . so no one is overwhelmed with too much work or tries to fill too many roles simultaneously.” The author also suggests working “peer-to-peer with everyone from individual contributors to vice presidents” to build support for user-centered design. “Organizing technical communication and UX design into a single team can strengthen relationships and reinforce the message” that everyone is working toward the same user-centered goal.

Lyn Gattis

Usability evaluation of an accessible collaborative writing prototype for blind users

Schoeberlein, J., & Wang, Y. (2014). *Journal of Usability Studies*, 10, 26–45. [doi: none]

“Collaborative writing technology is utilized in the workplace to co-author documents. Unfortunately, this technology is not accessible or usable for persons who are blind. As a result, persons who are blind cannot participate in collaborative writing that is critical in business and in collegiate environments. In order to improve the accessibility and usability of collaborative writing technology, a Microsoft Word add-in prototype was designed, developed, and tested using an iterative design approach involving two rounds of one usability

study. Eleven participants, who are blind with no residual vision, participated in the usability studies and provided feedback and suggested improvements based on their experience while interacting with the Word add-in prototype. The prototype was modified based on the suggested improvements from the participants after each round of the usability study. Before the second round of the usability study, the dependence on the Word ribbon menu was replaced by the utilization of Windows message boxes for presenting, accepting, and rejecting document revisions and comments. The participants of both rounds of the usability study ‘agreed’ or ‘strongly agreed’ that the Word add-in prototype interface was clear and understandable, easy to use, improved their performance, and enabled the tasks to be completed without any problems. Also, the participants were satisfied with the time that it took to complete the study tasks, and they would utilize the Word add-in interface in the future on a regular basis.”

Ginnifer Mastarone